Chemical Age

LABORATORY EQUIPMENT REVIEW
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VOL. 82 No. 2093

22 August 1959

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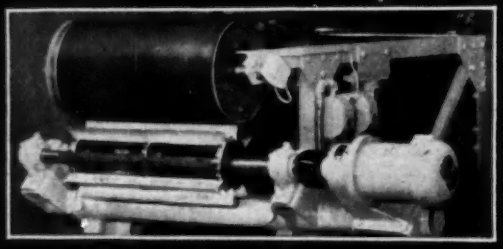

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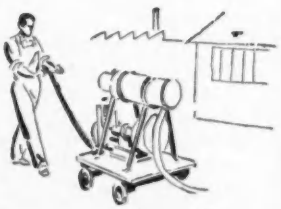

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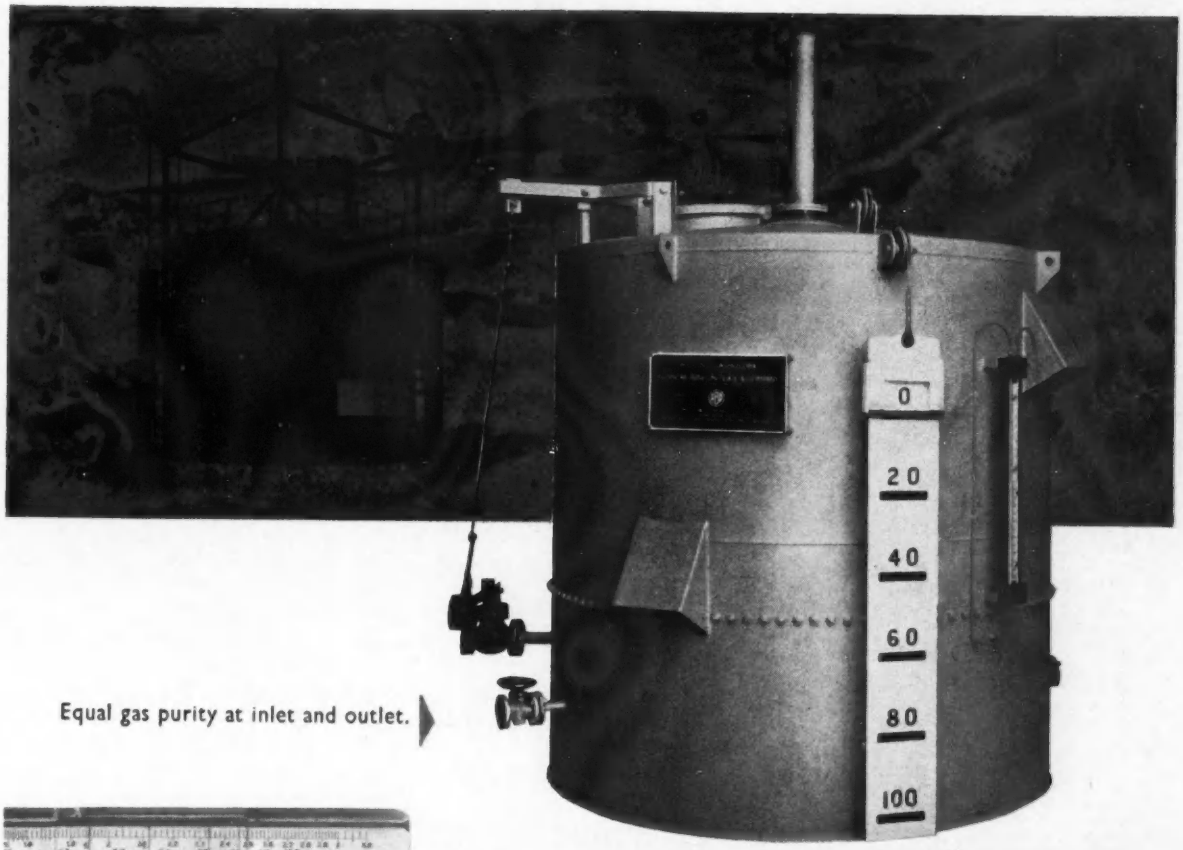

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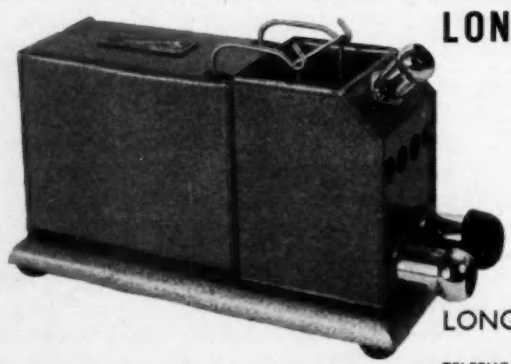

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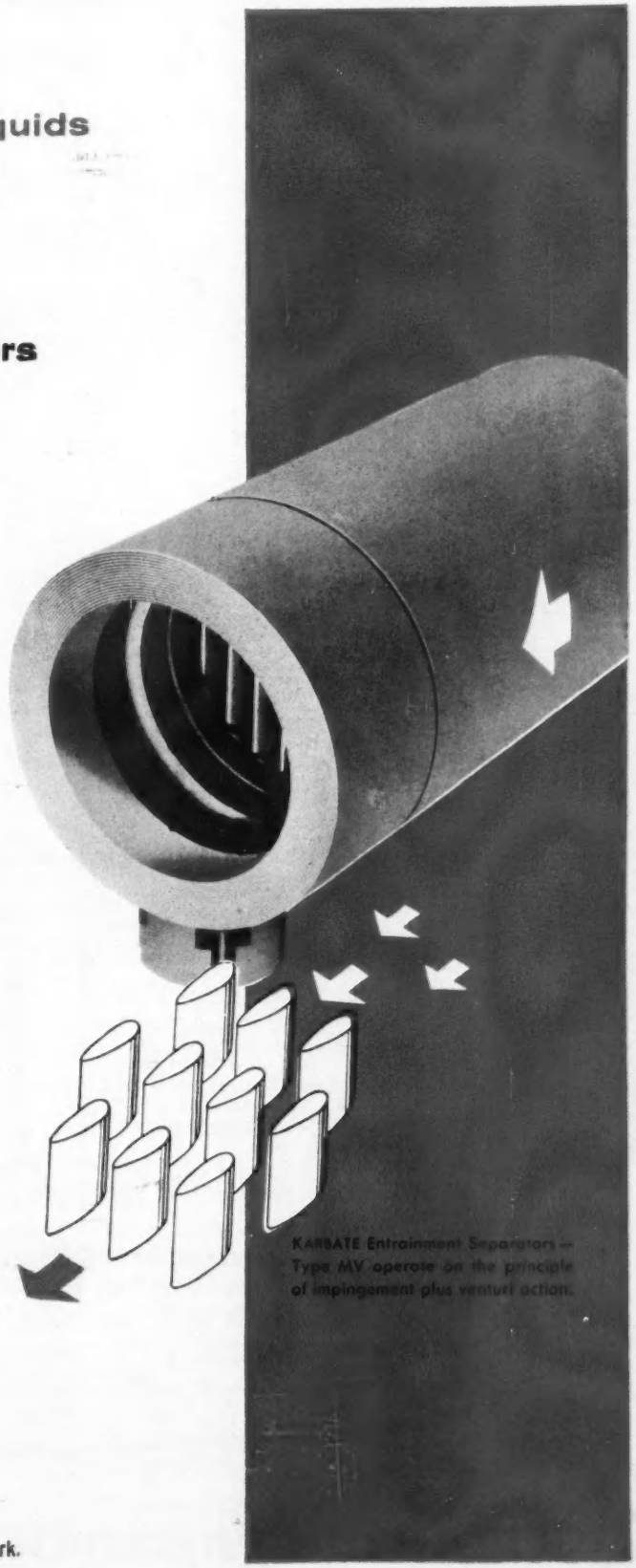
Type MV units offer you consistently better removal of entrained liquids from gas streams over a wide range of gas flow rates, entrainment content and liquid droplet sizes. They make possible outstanding economies in removal of entrained liquids and solvent recovery. No moving parts and minimum clearance of ¼ in. (.64 cm.) between rods prevents clogging.

KARBATE Entrainment Separators — Type MV are virtually immune to corrosion over temperature range from —40 to 170 deg. C Streamlined tear drop rod shape retards re-entrainment and provides minimum resistance to gas flow.

Type MV units are available in six standard sizes, from 6 in. to 24 in. (15.2 cm. to 61 cm.) I.D. All units are self-contained and ready to install.



KARBATE Entrainment Separators — Type MV operate on the principle of impingement plus venturi action.

For more details on how you can benefit by using KARBATE Entrainment Separators, write to:
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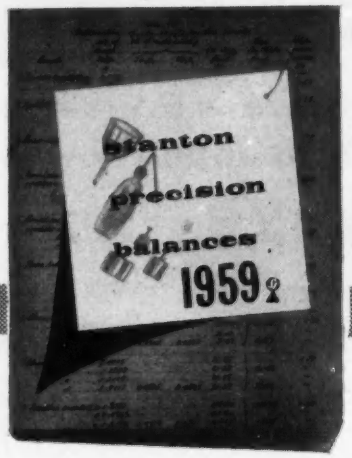
NEW 1959 CATALOGUE is your complete guide to precision balances



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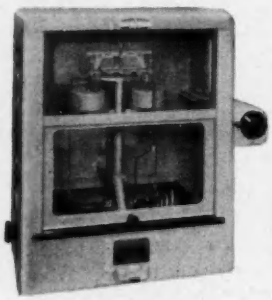
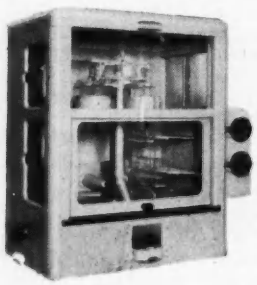
New Feature– **set of weights included**



STANTON **A.49**

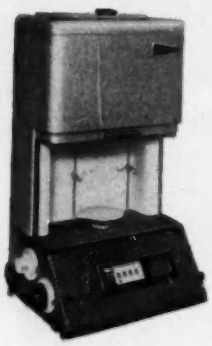
Already one of the most popular balances in our range. A set of five weights from 10-100g is now built into the case on a small turntable adjacent to the pan, for greater convenience and quicker weighing.
Capacity 200g—
Sensitivity 0.1mg.

New Feature– **Twin bankweight loading**



STANTON **B.20**

A worthy successor to Britain's first full Weight-loading Balance, this model now incorporates a new graticule and twin bank weightloading, for greater convenience and quicker weighing.
Capacity 200g—
Sensitivity 0.1mg.



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Sensitivities 0.1mg.—1mg.

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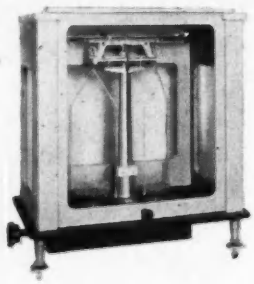

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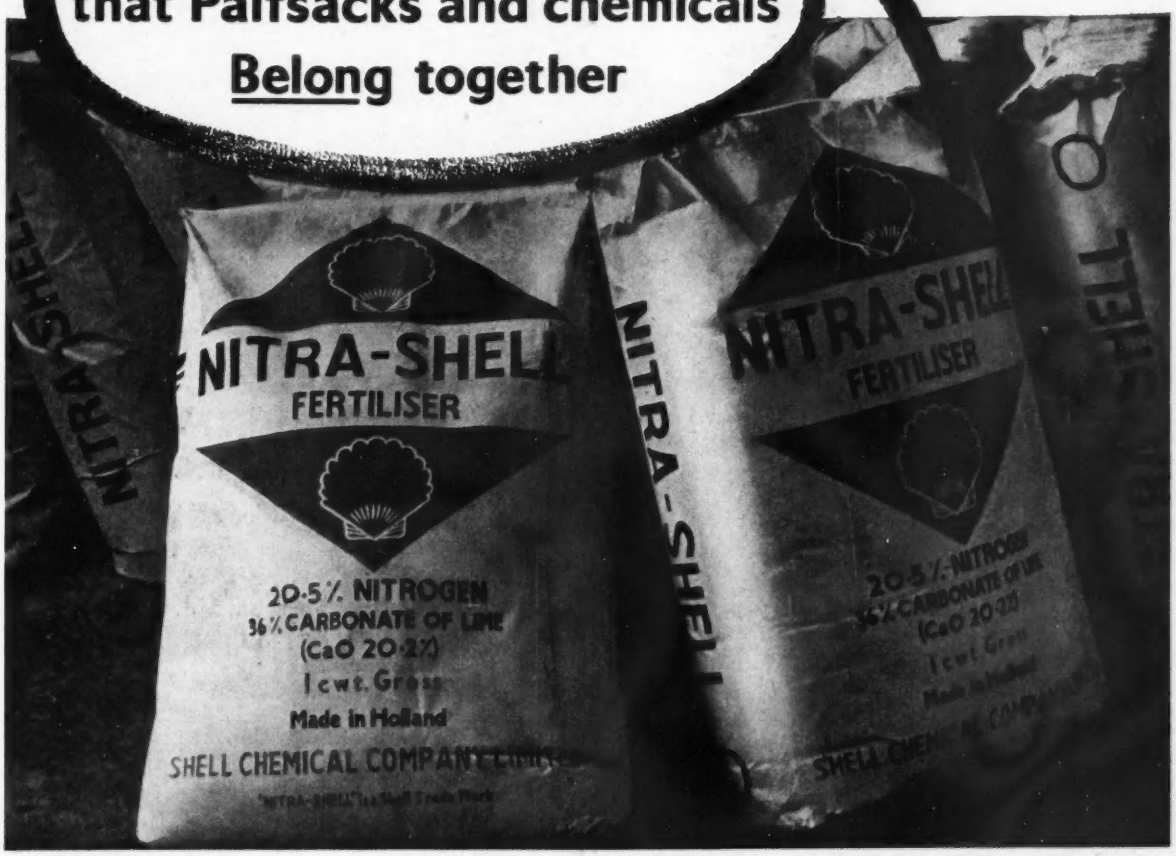

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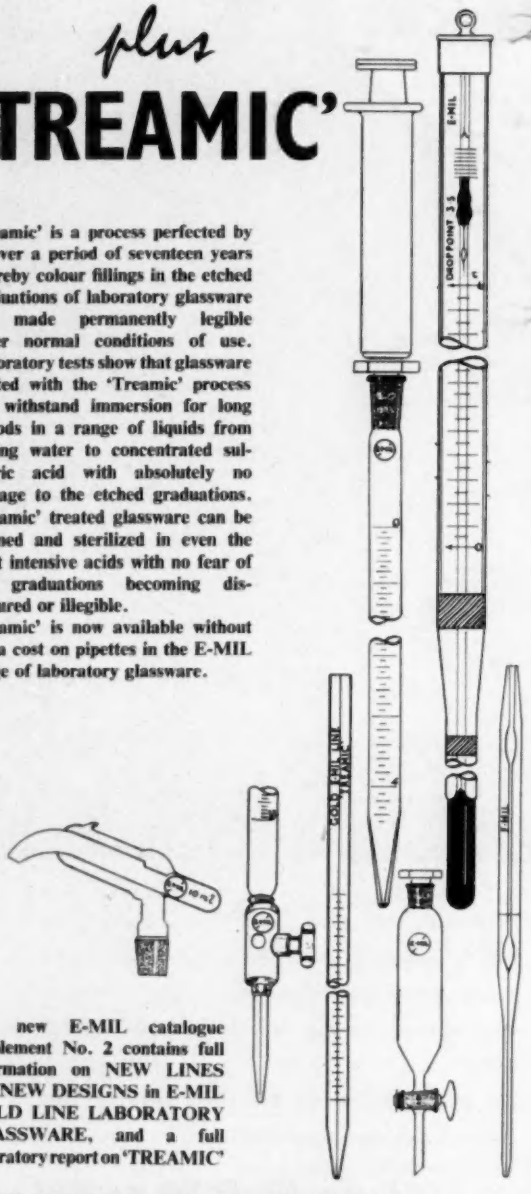

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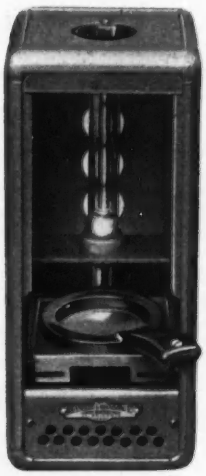

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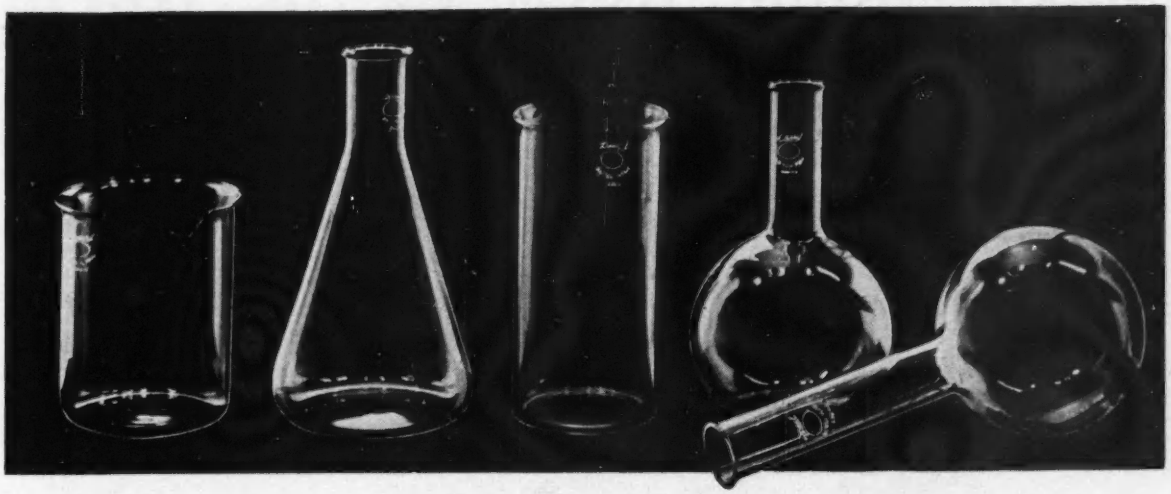

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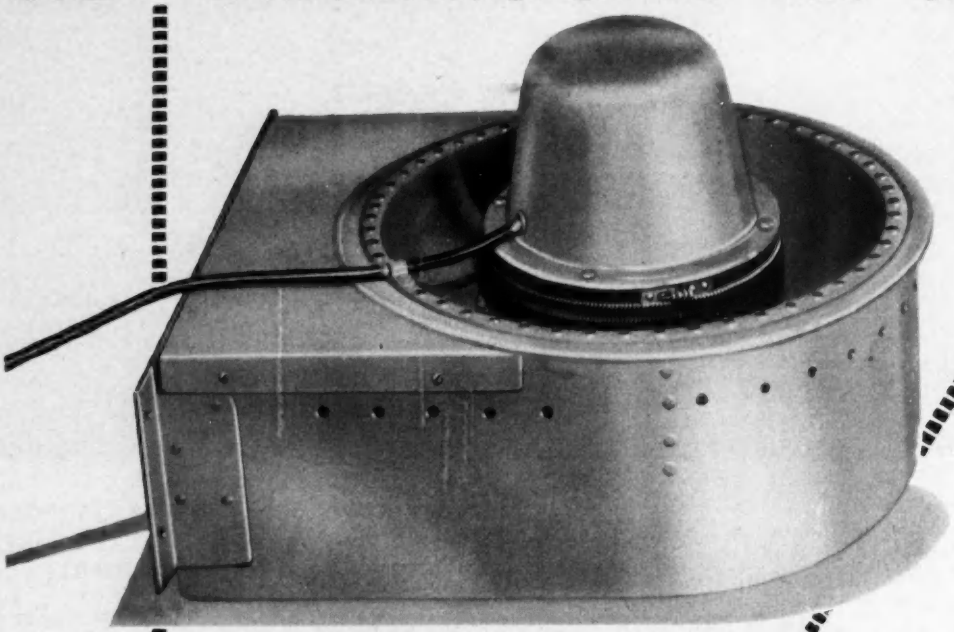

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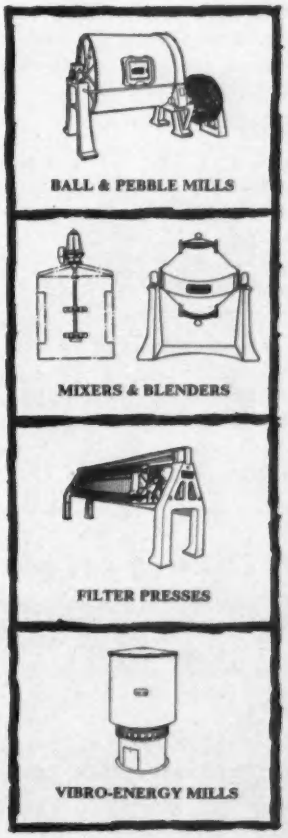
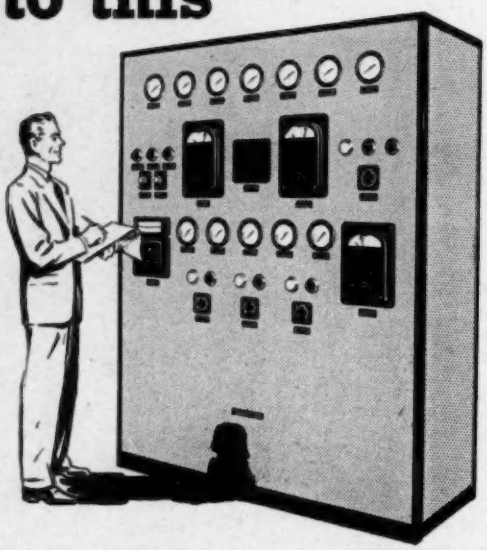


From this to this



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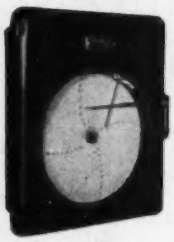
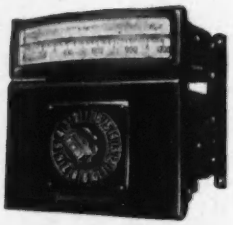


Disc chart pressure recorder



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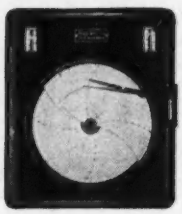
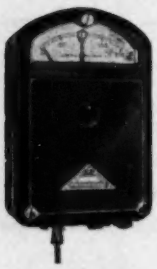
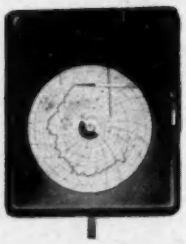


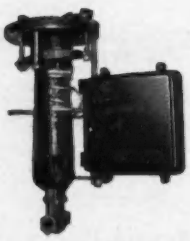
Air-operated compound controller



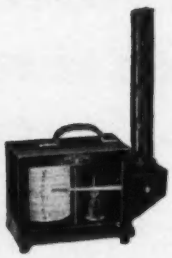
Dial Pressurestat



" Mersteel " recording thermometer



Valve positioner



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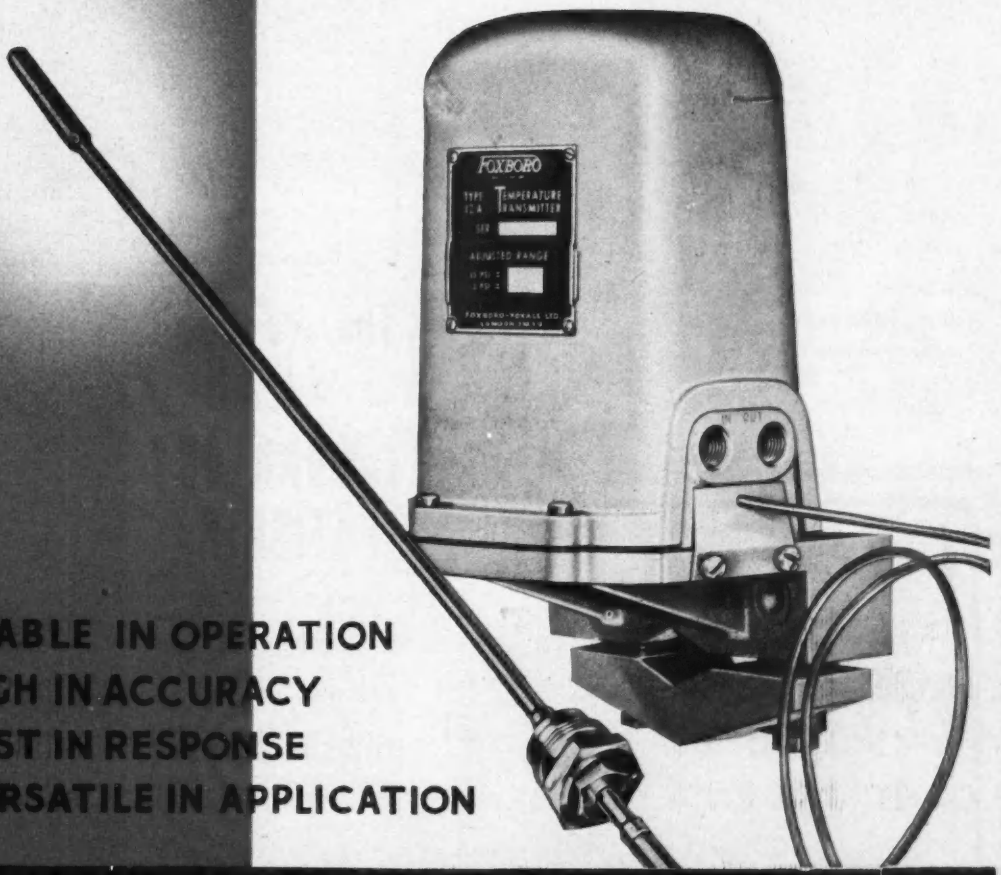

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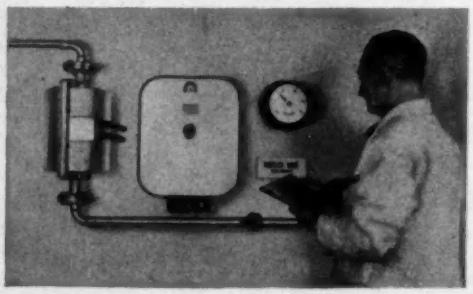

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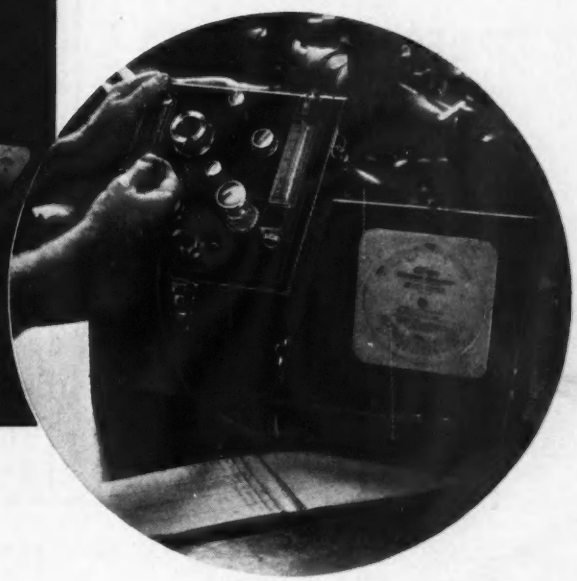

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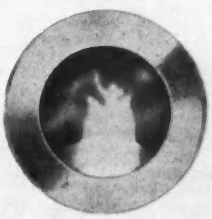

Eliminates guesswork

The gas sample is held in an enclosed observation chamber at a pressure above atmospheric by an efficient hand pump. The fog and its vanishing point are seen clearly in a cone of light.

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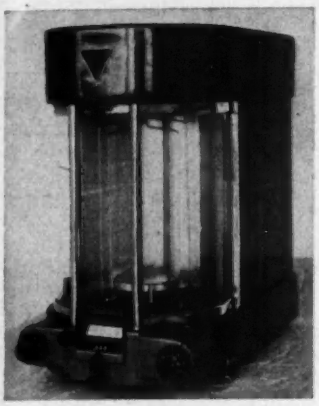

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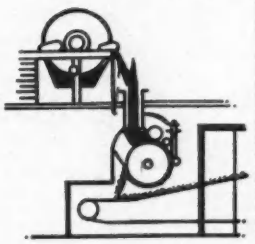
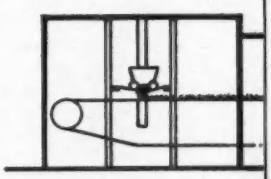
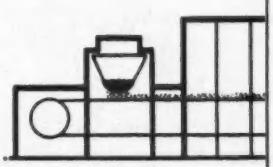
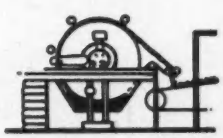
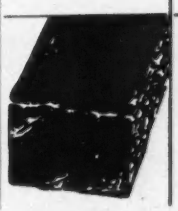
PREFORMING FEED	'SHAPE' ACTUAL SIZE	FEATURES
		**FIN DRUM** *The wet-solid is pressed into grooved surface of internally heated drum, partially dried, then discharged in 'sticks' about $\frac{1}{16}$" square and $\frac{1}{2}$" to 2" long.*
		**EXTRUSION** *The material is forced through a perforated plate and forms a spaghetti-like extrusion, about $\frac{1}{2}$" diameter and 1" to 3" long.*
		**GRANULATING** *Suitable for certain lumpy or granular materials as well as hard framed press cake. The wet-solid is pressed through a screen: mesh size varies with class of material.*
		**FILTER** *Material is scored on the drum of the filter and allowed to break at the discharge point into lengths of about $\frac{1}{2}$" square. $\frac{1}{2}$" to 3" long.*

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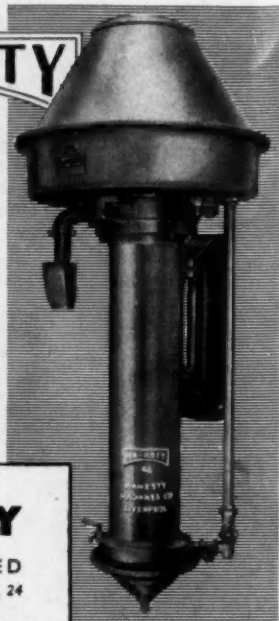

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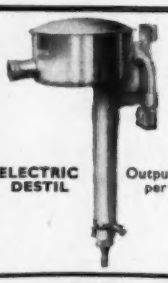

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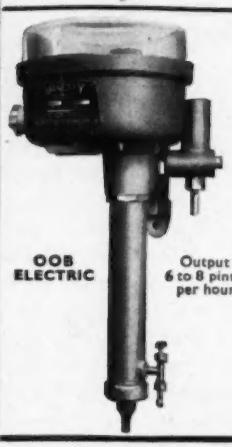

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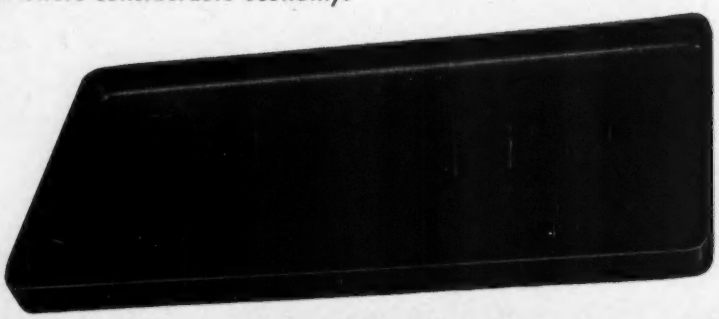

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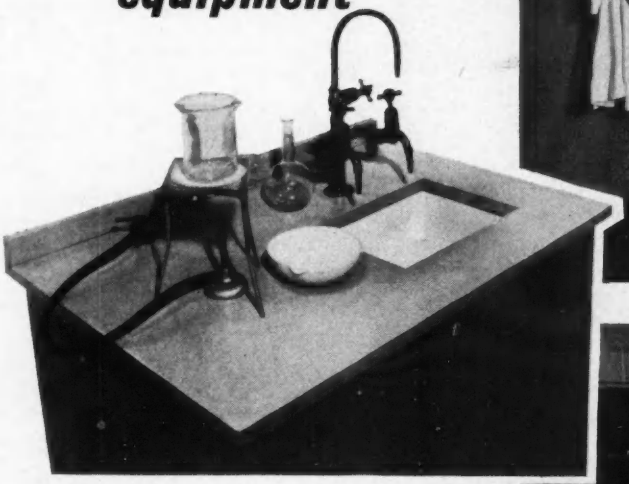

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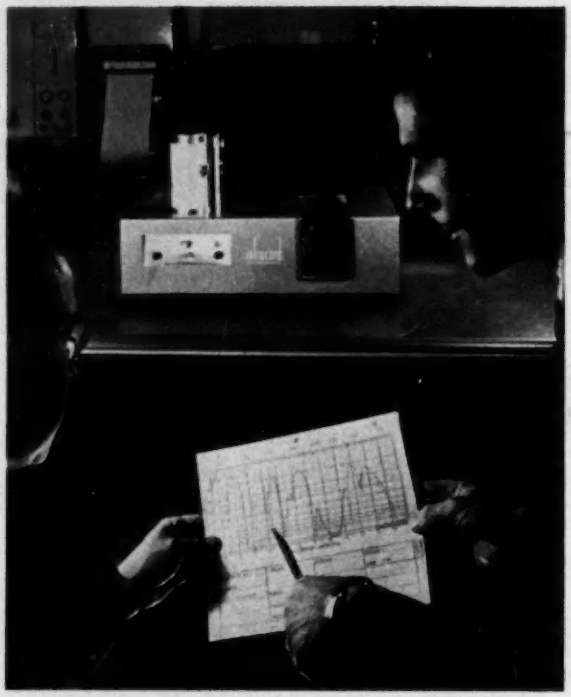

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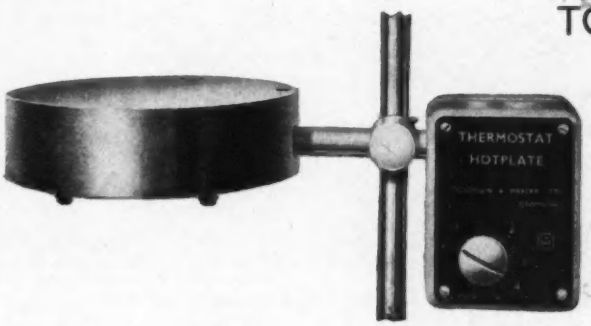

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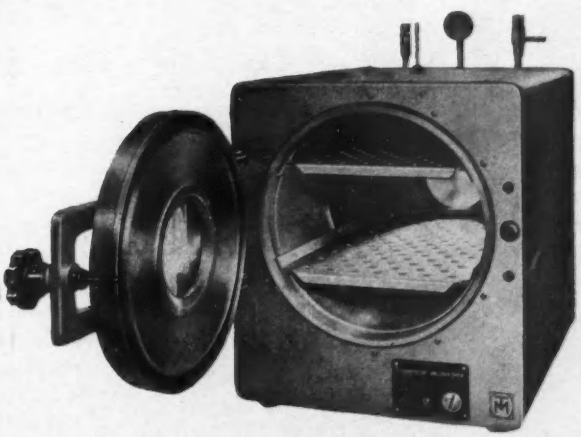

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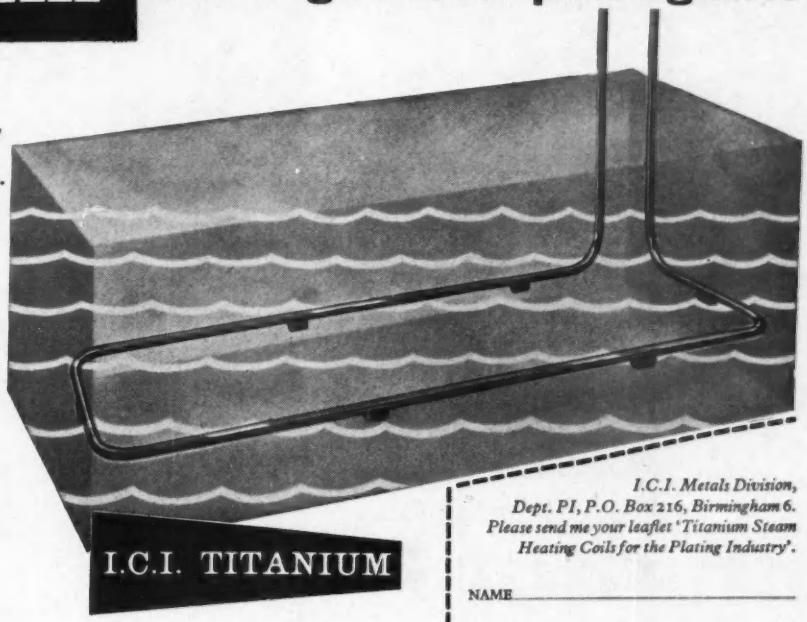

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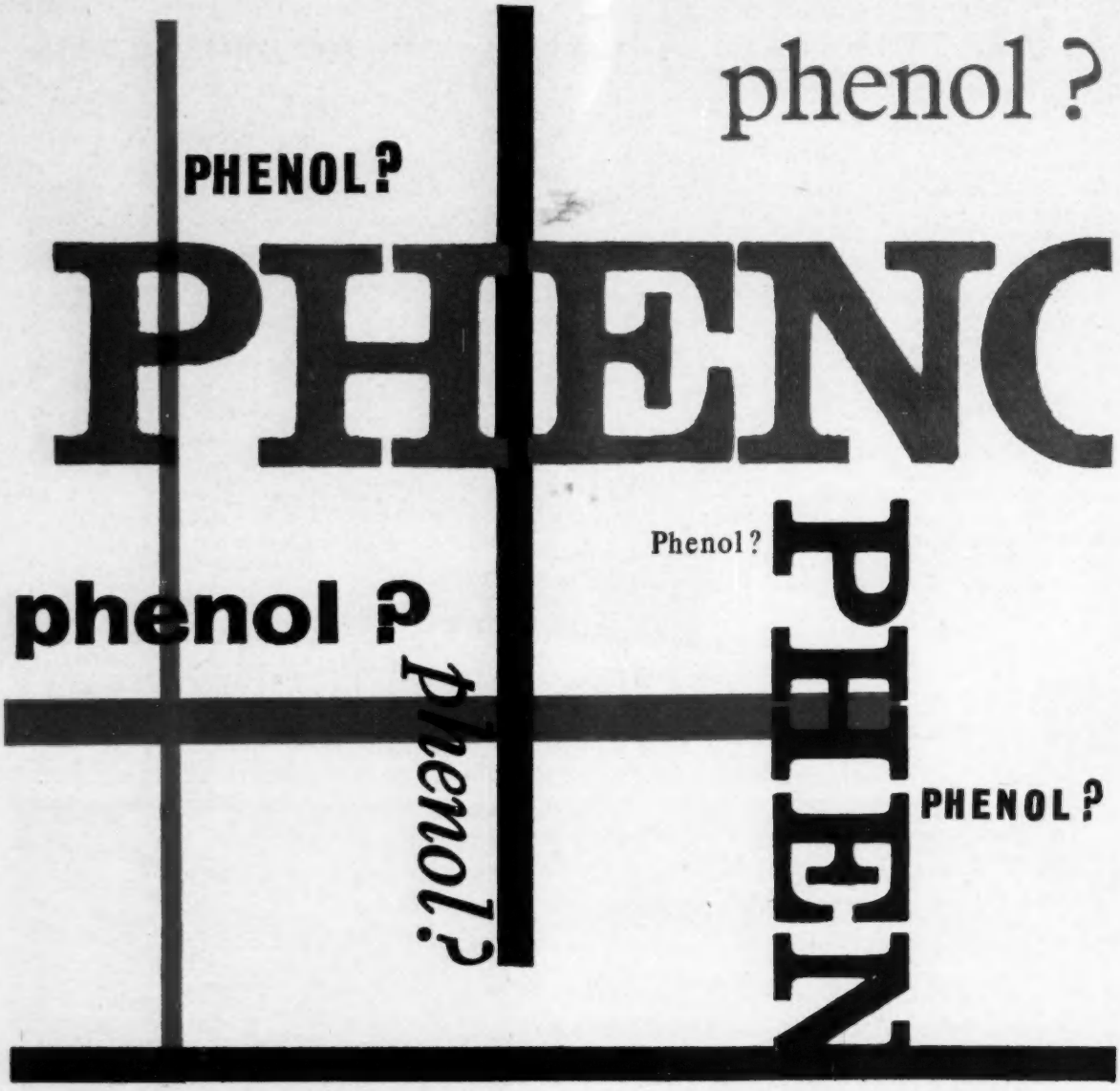

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AUGUST 22 1959

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CHEMICAL AGE

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RUSSIA'S PROBLEMS

SERIOUS shortcomings in the building of the U.S.S.R.'s much boosted chemical undertakings, in producing chemical equipment and in the work of planning and research institutions were the subject of complaints in a recent issue of the Soviet Communist Party newspaper *Pravda*. The need for greater speed in developing the country's chemical industry is emphasised as are the "absence of precision" in the planning of production and distribution of chemical equipment and delays in the supply of equipment to building sites.

This news comes some six months after Mr. Khrushchev's speech to the 21st Soviet Communist Party Congress in Moscow at the end of January (CHEMICAL AGE, 7 February, p. 237), when he dealt with the U.S.S.R.'s plans for the chemical industry's expansion.

That delays in Russia's chemical industry development plans have occurred are shown in the strong criticisms made by Mr. Fedorov, head of the Soviet State Committee for Chemistry, at a recent meeting of the Central Committee of the Soviet Communist Party. Work on no less than 177 out of 230 construction projects is behind schedule, he indicated, and fault was found with planning, design, research, capital investment, supply of vital machinery and building work. In serious difficulties are important rubber, synthetic fibre and alcohol plants in Bashkiria, Altai, Kuybishev, Azerbaijan and other key areas in the East. These difficulties have arisen because of bottlenecks in the supply of metal pipes, stainless steel, fittings and building materials. It will be recalled that the areas mentioned above were, under the Seven-Year Plan, scheduled to play a vital part in expanding production capacity this year.

According to Mr. Fedorov, machinery factories have been violating contractural delivery dates; others, in spite of the dire shortage of equipment, were producing non-essential goods. Unsatisfactory design and research work at the Chemical Machinery Institute has been holding up the re-equipment of industry. Designers often ignore technical advances abroad, experts tend to work in isolation without co-ordinating their jobs, and many scientists are pursuing what Mr. Fedorov called impractical labour on obsolete topics.

In the chemical field, a recent survey of published Russian literature by the U.S. Government indicates that Soviet scientists are not ahead on any process, products, or applications. The study included material on lubrication, lubricants, and additives and formulation of lubricating compositions. Also, at the recent Soviet Exhibition of Science in the U.S., the chemical section was reported as being badly overshadowed by other sections, while Soviet instruments were described as not novel or particularly outstanding.

At the same meeting of the Central Committee mentioned earlier, Mr. Khrushchev told of instances where imported equipment—on which the Government had spent hundreds of millions of roubles in the last few years—was not being properly used. He even mentioned that such equipment had been lying around in some plants getting rusty because the State Committee for Chemistry had not completed the necessary documentation. Failure to use expensive imported equipment, however, may be due to other reasons. The latest Central Statistical Board report blames what it calls "technical

conservatism" on the part of some workers for the failure to introduce modern equipment and machinery in fields where work is behind schedule, such as gas extraction and production of chemical and oil equipment.

From the reports to the Central Committee, there would seem to be a good deal of doubt as to whether the U.S.S.R. will really be able to complete all the ambitious projects called for by the current Seven-Year Plan. At the same time, however, steps are being taken to remedy the situation for Mr. Federov is insisting on a detailed examination of every chemical enterprise and strict observance of the party's directives. Special party commissions are to be formed to control plant managements and to report all shortcomings. It appears, too, that many items are planned by weight. The result is that where a machine tool is twice as heavy as it needs to be, the factory concerned can claim the extra weight towards fulfilment of its plan.

Specially to be noted is the increasing economic integration of the eight countries of the Council for Mutual Economic Assistance—that is, the Soviet Union and its European satellites. The Council claims to have already co-ordinated plans for the production of nearly 600 items of machinery and equipment, and division of production has been agreed on 11 types of artificial fabrics, nine kinds of synthetic rubber and six of artificial fibres and fertilisers. One of the latest moves has been a conference of experts from the eight countries in Dresden where plans are said to have been co-ordinated for construction of chemical apparatus. The aim here is to ensure up-to-date technology in the chemical plants of member countries and to eliminate overlapping in design and development work.

The U.S.S.R. is evidently making great efforts to catch up with the chemical industries of the West, but the time being taken to realise their ambitions will be very much greater than the Soviet Union, or even, for that matter, observers outside the Iron Curtain countries, envisaged.

UPGRADING LEAD CONCENTRATE

IN plant scale tests, now being carried out by Mount Isa Mines Ltd., the economics of removing a pyretic-carbonaceous concentrate prior to lead flotation is being determined. The concentrate produced, however, contains considerable lead, and current work is being directed towards upgrading the concentrate and at the same time producing a discardable tailing.

Test work is also continuing with the use of gangue depressents in lead flotation. There are indications that some of these reagents will give an increase of 3-5% in the grade of the lead concentrate.

In copper flotation, sodium secondary butyl xanthate has replaced sodium ethyl xanthate. Besides giving markedly superior metallurgical results, particularly in the Warser size ranges, Mount Isa report that butyl xanthate consumption is considerably lower than that of ethyl xanthate.

HYDROGEN FROM REFINERY OFF-GAS

AROUSING interest in the U.S. as far as hydrogen producers, distributors and users are concerned, is the production of high-purity hydrogen from Esso's refinery off-gas at a price stated to be competitive with electrolytic hydrogen.

At Bayway, N.J., a small plant of Van de Mark Chemical uses indirect cooling with liquid nitrogen to condense out impurities so that hydrogen of better than 99.99% purity is obtained with less than 75 p.p.m. hydrocarbons and less than 10 p.p.m. CO.

Linde, who distribute the hydrogen, state that it is as good as, if not superior to, electrolytic hydrogen. Some 15 million standard cu. ft./month are produced at Van de Mark's plant, which cost less than $250,000. Hydrogen feed at 150 atmospheres passes through a battery of ¼-m. tubes cooled by liquid nitrogen at −300°F.

Special design ensures not only high heat-transfer rates but also the close temperature control required to prevent condensed impurities from freezing before removal. Water and hydrocarbons are removed by adsorbent beds of molecular sieves and activated carbon. Heat leak has been kept down to 1,200-2,000 B.t.u./hr. Design of the plant was evolved by Chemical Design Inc., Lewiston, N.Y.

DNA AND HEREDITY

A CURRENT hypothesis, exciting to scientists who study the basic patterns of life, suggests that the complex structure of the protein molecule can provide a clue to the workings of heredity. University of Wisconsin scientists Professors Van R. Potter, Charles Heidelberger, and Gerald Mueller, cancer researchers; bacterioligist Professor Harlyn O. Halvorson; and biochemist Professor Robert M. Bock have contributed significant findings to world-wide investigations of this relatively new view.

Recent studies have suggested that a substance deoxyribonucleic acid DNA controls the making of proteins in the animal system, that is, that 'putting together' of amino acid units. Chromosomes control heredity and the chromosomes are believed to be composed of DNA. The DNA molecule, like the protein whose structure it controls, is composed of two long chains which entwine around each other and are joined by cross-links. These cross-links are thought to be check points in the protein contruction mechanism.

The DNA molecules is thought to have two functions. In addition to providing the molecular pattern for proteins, it makes copies of itself at the time cells divide. DNA has nearly a foolproof system of duplicating itself, but it does make mistakes. Perhaps one in a million tries, reports Professor Potter, and since the body contains billions of cells, the total number of 'errors' is quite high.

By themselves these errors are quite harmless, but in the "right" combination in a single cell they can lead to formation of a cancer cell. As the cell is copied further, the defect is transmitted into other cells.

Potter calls this "a realistic approach to the cancer problem", which explains the interest of the cancer researchers in the DNA hypothesis.

Chemical analysis of the chains of amino acids which make up a protein is the project of Professors Bock and Halvorson. They hope to learn the nature of the code in DNA which controls heredity, and to determine the mechanism of the code's function in the bacterial or germ cell, the cells containing chromosomes and genes. Bock and Halvorson are attempting to isolate molecules containing coded information, and to establish conditions in a test tube where this information can be used to make proteins. As a necessary first step in analysis of proteins, Bock has developed a chemical method for breaking up long-chain proteins into shorter chains easier to handle in research—20 to 30 amino acid units long.

Professor Potter has isolated an enzyme from animal tissue which can make "copies" of DNA, if provided with a pattern DNA molecule and Professor Mueller has been able to 'grow' virus proteins in a cell-free media or in a test tube. Professor Joshua Lederberg has shown that pure isolated DNA can carry genetic information from one bacterium to another. And Professor Heidelberger has interfered with the growth of cancer cells by preventing them from copying themselves; in other words, by "scrambling" coded information in the DNA.

Distillers Annual Report

INDUSTRIAL GROUP'S SHARE OF D.C.L. PROFIT DOWN 5%

CONTINUED incidence of more difficult trading conditions experienced by the Industrial Group of the Distillers Co. Ltd., and the substantially increased profits of their whisky companies have brought about a position whereby the proportion of profit attributable to the Scotch whisky and gin groups is about 80%, the balance of 20% being attributed to D.C.L.'s industrial activities. This is stated by Sir Graham Hayman, chairman, in his annual report to shareholders for the year ended 31 March 1959. This whisky-gin and industrial breakdown compares with 75% and 25% respectively last year.

Volume of sales of the Chemical Division of the Distillers Co. Ltd. has in general been maintained at home and in export markets, despite more difficult trading conditions. Sir Graham notes that competition, particularly from overseas, has caused reductions in selling prices and has given added significance to research carried out by the company. Appropriations for D.C.L.'s research, development and engineering departments for the year was about £2 million.

Production of acetone and butyl alcohol from fermentation of molasses has ceased because of the high cost of molasses. The subsidiary operating the process, Commercial Solvents (Great Britain) Ltd., Bromborough Port, has now been wound up. Some plant and equipment have been transferred to D.C.L.'s Hull factory where certain of the operations carried on at Bromborough are being re-established using petroleum-based raw materials.

Carbon dioxide sales have been maintained and calcium carbide sales which fell from the record figure of last year, showed a revival in the early part of 1959 and are expected to continue at a high level.

Good progress is recorded as having been made with construction of the large new plasticisers plant at Hull, and part is already in commission. Main products will be phthalates of high quality required by the plastics industry. A continuous system of esterification invented by D.C.L. technicians is employed. Results obtained by an overseas licensee are stated to confirm that the process will prove highly efficient.

Good progress is reported for the Chemical Division's associated companies—Honeywill-Atlas Ltd. (special surface active agents), Hedon Chemicals Ltd. (vinyl acetate), and Orobis Ltd. (lubricating oil additives). Murgatroyd's Salt and Chemical Co. Ltd., 50% D.C.L. owned, report that demand for chlorine is now at a high level.

British Hydrocarbon Chemicals Ltd., with their subsidiaries, Forth Chemicals and Grange Chemicals, showed a further improvement in earnings.

The new 'Rigidex polyethylene' plant due to be completed April last, is now being commissioned. A 'number of circumstances including unofficial strikes' have delayed this plant.

Construction of British Hydrocarbon's phenol plant has made good progress and it is expected to start up towards the end of this year. The new cracker plant, due to be completed in 1960, will have a capacity of some 70,000 tons of ethylene yearly and will be the largest outside the U.S. It will more than double present capacity at Grangemouth. Output will supply current and projected ethylene users at Grangemouth but there will be a 'small surplus for future developments'.

Plastics sales rose over the previous year, D.C.L.'s Plastics Division states: lower prices, however, have narrowed profit margins. Further expansion in productive capacities has been authorised to meet the anticipated growth in demand for plastics materials.

In the Biochemical Division, the volume of sales was higher than in the previous year and earnings were 'reasonably satisfactory', but prices of antibiotics overseas are stated to have reached uneconomic levels. Marked improvements in technical operations, however, have resulted in lower costs, enabling the division to meet competition. Sales of Distaval, a sedative, are developing satisfactorily.

To facilitate operations in Australia, Distillers Company Biochemicals (Australia Pty.) Ltd., have been formed. Associate company, C.S.R. Chemicals Pty. Ltd., had their best year to date and a programme of new developments is now under active consideration. In South Africa, associate company, National Chemical Products Ltd. and their subsidiary, Poly Resin Products Ltd., had a good year with satisfactory earnings. (See also p. 188 this issue.)

Notice to Subscribers

During the printing dispute, when normal production of "Chemical Age" was interrupted subscribers have received emergency issues which continued to provide them with a service of essential trade news and advertisements.

In addition, subscribers will receive a rebate of 7s. per annual subscription on renewal. This will be shown on all renewal invoices and statements starting September and carrying through until August, 1960.

U.K.—U.S. Chemical Engineering Partnership

ARTHUR G. MCKEE and Co., of Cleveland, Ohio, and Head Wrightson and Co. Ltd., Thornaby-on-Tees, have formed a new company, McKee Head Wrightson Ltd., with headquarters in London. It will combine the experience of the two parent firms in the designing, engineering and building of petroleum refineries and chemical plants throughout the world exclusive of North America.

Ownership of the company will be shared equally by McKee and Head Wrightson. The two companies have been associated for the last 15 years in contracting for the steel industry in the British Commonwealth. This association, which is independent from the petroleum and chemical operations of the new company, will continue. The parent companies will also continue their individual activities.

Sir John Wrightson, Bt., and Mr. Hank Widdell, president of Arthur G. McKee, after agreement had been reached

I.C.I. Introduce New Silicone Antifoam

A NEW silicone antifoam—DP.44—has been added to the I.C.I. development range. In emulsion form, DP.44 is stated to be readily dispersed even in cold water, a property which, coupled with low viscosity, gives both improved defoaming and antifoaming action. Difficulties in the preparation of working dilutions are eliminated and the product is very easily handled during manufacturing processes.

DP.44 is recommended for all types of aqueous systems except in the processing of foodstuffs where it is not recommended because it contains a bactericide. It is effective in dilutions of from one to 50 parts per million parts of foamer. With its use, process and product efficiencies are increased and the effective capacities of stills, kettles and other equipment can be increased by 30 to 50%.

In many processes, including distillations, where inflammable foam may build up, the presence of DP.44 as inhibitor or suppressor will minimise the danger of fire and cut down process time by permitting continuous heating.

★ THE 'polythene' or 'polyethylene' battle continues, with another round awarded to polythene. Since CHEMICAL AGE held a reader poll on the subject last summer—with an overwhelming vote in favour of 'polythene'—the British Plastics Federation has officially supported this word; it also has the support of the British Standards Institution.

Latest move comes from the polythene film makers who say, through the Packaging Film Manufacturers' Association, that it would seem "foolish to foster confusion by the use of two names for the same product." They add that the term 'polyethylene' was evolved in the U.S. under "a mistaken impression that 'polythene' was a registered name in the U.K." The association adds: "it is . . . high time this error was corrected and the polythene film manufacturing members of this association, which represents all the principal makers, have agreed that they will use exclusively the name 'polythene'".

Now it seems that most of the users of polythene are in favour of using that word. This is a sensible decision for the British housewife knows 'polythene' but it would be expensive in advertising space and money to try and convince her that 'polyethylene' is the same thing, but with a different density. Polymer manufacturers will be wasting their time and money if they intend to 'sell' the word 'polyethylene' to the British public.

★ RECENT years have seen a period of great change for A. Boake Roberts and Co. Ltd. and the use of simplification techniques has exerted "the most profound effects on the fortunes of the company". This was stated by Mr. Bertram White, managing director, at a recent conference of standards engineers. Five years ago Boake Roberts produced 1,500 separate aromatic chemicals; today this figure is down to 230.

The process of elimination began with a study of the sales value of each product. As a start it was decided to throw out all items on which less than £100 worth of business was done each year. Further weeding-out followed and entire product ranges were dropped if they did not fit in with the overall production plan. In all this, the welfare of customers was carefully studied and when necessary, arrangements were made with other firms to supply lines dropped by Boake Roberts.

According to Mr. White the numerous advantages resulting from this drastic rationalisation include: longer runs; less stocks carried; less specialised plant; salesmen were given a chance to sell instead of carrying catalogues around; research and development has been concentrated on fewer important projects. The total number of orders received today is half that of six years ago, but their value is much more than double. That is the pay off.

★ AN INDICATION of the Italian chemical industry's growing apprehension at their country's commitments under the European Common Market was given recently by Dr. Luigi Morandi, vice-president of Montecatini. He pointed out that Italy's trade in chemicals with the C.M. and its dependent territories presented an adverse balance.

In 1958, Italy imported from the C.M. area, chemicals to the value of 55,000 million lire (£31.8 million) and exported to the area chemicals worth 20,000 million lire (£12.5 million). This made a deficit of 35,000 million lire (£20.2 million). So far as individual members of the C.M. are concerned Italy had an adverse balance in chemicals as follows: West Germany, nearly 26,000 million lire (£15 million); France, just under 4,000 million lire (£2.3 million); Netherlands, just under 4,000 million lire (£2.3 million); with Belgium and Luxembourg, a little less than 1,500 million lire (£869,000).

★ THE second U.S. firm to produce terephthalic acid, Oronite Chemical Co., Richmond, California, say they have achieved this on a commercial scale with their isophthalic acid unit at Richmond, Cal. Du Pont make terephthalic acid for their own Dacron needs and Amoco may, it is thought, enter the field at their Joliet, Ill., plant.

Oronite's switch from isophthalic to terephthalic production, according to *Chemical Week*, 1 August, p. 32, requires only minor adjustments in the final purification step; feedstock for making isophthalic is *m*-xylene, for terephthalic it is *p*-xylene.

Pending completion of a study of the U.S. market for terephthalic acid, Oronite have switched their plant back to full-scale production of isophthalic acid. Terephthalic so far produced by Oronite is earmarked for Japanese producers of polyester-type fibres and will bridge the gap until the terephthalic plant of Mitsui comes fully on stream. The fibres will be made by Teikoku Rayon and Toyo Rayon.

★ SCIENTISTS at the Australian Mines Research Laboratory, Adelaide, think they have found a rare and valuable metal with a high melting point which could revolutionise rocket research. This news reaches me from Mr. I. M. McLennan, chief general manager of Broken Hill Proprietary.

He says that the name and nature of the metal must remain top secret for the time being. Apparently the presence of the metal was never suspected, but it was discovered in the effluent of "a certain process".

This discovery which will cause much speculation, comes too late to be of any assistance to the team now preparing the world's first manned space flight. This is scheduled to take place in the U.S. X-15 40,000 ft. above the Californian desert. The pilot, Mr. Scott Crossfield, will sit astride the fuel tanks which hold the highly explosive hydrogen peroxide and liquid ammonia.

The hydrogen peroxide will drive two of the three rocket engines and the oxygen with which it is mixed is carried as a liquid. Since this boils off at −300°C it must constantly be fed into the tanks during the preflight run-up to enable the X-15 to take off fully powered. Helium gas under pressure is used to maintain tank pressures and to move the fuel to the engines, which will consume the hydrogen peroxide and liquid ammonia together with the boiling oxygen at a rate of 10,000 lb. (some five tons) a minute.

★ SUBSTANTIAL inroads have already been made on the markets formerly enjoyed by the traditional rope-making materials by synthetics such as nylon, Terylene and, more recently, polythene. Now I learn that rope made from the latest major development polymer—polypropylene—is being tested on a large tanker. Earlier tests made on a smaller tanker are claimed to have shown that a 7 in. in circumference hawser could safely hold by itself a smaller tanker in winds that were so strong that two tugs could not keep the ship in check.

Polypropylene rope has high strength coupled with resistance to rot and mildew. It also has good resistance to chemical attack and is waterproof.

This new rope may also hit other plastics ropes since it is said to retain its strength even under wet conditions, when most ropes made of man-made fibres lose some strength.

★ A USEFUL method of jointing or bonding silicone rubber has been developed in the research department of I.C.I. Nobel Division. The method, which overcomes a complication when joining the ends of extruded silicone rubbers in the production of large rings for engineering and industry, makes use of two vulcanising agents with different activation temperatures which can be decomposed independently of each other.

The uncured stock is formed by extruding, moulding, etc., and lightly cured by heating at a temperature sufficient to activate the low temperature catalyst. The rubber can then be handled without distortion and the final jointing is carried out by making an overlap joint. This is pressed and heated at a temperature at which the second catalyst decomposes.

Catalysts or vulcanising agents that can be used are of the peroxide type, e.g., 2:4 dichloro-benzoyl peroxide and tertiary butyl perbenzoate.

Alembic

Howards Improve Aspirin Process, Rebuild Plant

ASPIRIN plant of Howards of Ilford Ltd., Ilford, has been rebuilt and extended several times since it was opened in 1916, and now the first part of a new major rebuilding programme has just been completed at a cost of more than £60,000. The process has been improved and plant capacity increased.

The improved process, developed in the company's laboratories over the past two or three years, gives a product of "exceptional uniformity with particularly good tablet-making qualities." In addition, the product is said to be unusually stable and tests have shown that it is able to resist unfavourable storage conditions over long periods.

The new plant is now in operation and the material being produced is stated to live up to expectations based on earlier pilot plant runs.

I.C.I. Employees to Share Bonus of £5½ m

MORE THAN 93,000 I.C.I. employees have qualified for the 1958 bonus under the company's profit-sharing scheme. This bonus amounts to £5,584,000 gross (average per employee £59 18s 6d) which after deduction of personal income tax is £4,131,000 (average per employee £44 6s 7d). This net bonus has been paid to the trustees of the scheme who will use it to acquire on behalf of employees £2,343,000 I.C.I. ordinary stock to be used for this purpose out of I.C.I.'s unissued capital.

When an employee has 40 or more units of stock standing to his credit, arrangements are made for the stock to be registered in his name. This year £2,976,000 ordinary stock will be handed over to 53,000 employees. Since the scheme was started in 1954, about 60% of the stock handed over to employees of all ranks has been retained by them.

Radiation Monitoring and Tracer Service

THE first commercial radiation monitoring and tracer service in this country is being launched by Ekco Electronics Ltd., Southend-on-Sea.

The service offered falls into three groups:

Group 1. Aimed at helping industry to achieve the requirements of the impending Factories (Ionising Radiations) Special Regulations. It includes carrying out site surveys and testing sources of radiation on the premises of users of industrial nucleonic equipment such as thickness and level gauges, X-ray machines, etc.

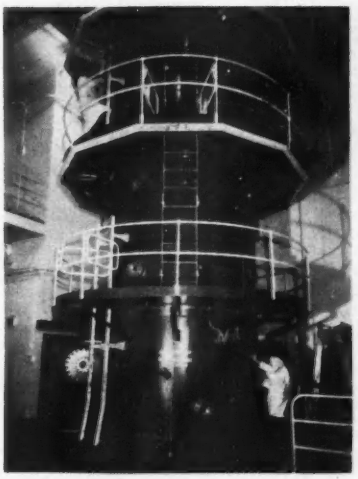
Group 2. A specialised service offered to public health authorities and includes the measurement of radioactivity in air, water, sewage, etc.

Group 3. A service for the benefit of industrial and scientific research. It allows for the carrying out of tracer experiments by skilled personnel without purchasing the equipment involved.

Dounreay to Raise Research Spending Tenfold In Year

A CLOSER partnership between the U.K. Atomic Energy Authority and private industry is urged in a report on the Production Group and the Development and Engineering Group of the authority published on Monday, 17 August.

Welcoming evidence that the authority intended to increase the volume of research and development work being placed with industry the committee state that it is planned that the value of work to be done extramurally should be trebled in the next few years. It was hoped that the extramural research expenditure by the Dounreay establishment would be increased tenfold in the next year.



Part of the 45-ft. high pressure vessel containing the Tandem electrostatic accelerator at A.W.R.E., Aldermaston. The machine, designed for the production of proton beams of 12m. electron volts energy, works at a tank pressure of 200 p.s.i.

The relative positions of the authority and of industry had been changing rapidly. The consortia of private firms engaged on nuclear work had built up their own research development and design teams and it was apparent that, with spare capacity available, they were eager to be given more opportunity to make an original contribution to this new technology.

By the middle 1960's development of plutonium technology, making cheap enrichment of fuel possible, could increase the prospects of small reactors in competition with those of the U.S. But for the time being, the committee is not in favour of the A.E.A. undertaking the development of a reactor specifically for export.

The report notes that a much tighter control of capital expenditure is now required. But it qualifies its criticism of some features of the control with acknowledgment of the technical and novel nature of many of the A.E.A.'s projects.

The importance of the successful development of the fast breeder reactor which will produce more new fissile material than it burns is strongly emphasised by the Select Committee. This system is expected to achieve both low capital and generating costs.

The progress report on this system is that the "tempo is now rapidly increasing." The A.E.A. is confident that the effort it is now making on the fast breeder reactor is enough to enable this system to be exploited commercially in the early 1970's.

The committee state that various reasons, including the cost of additional safety measures and the extra cost of working in the north of Scotland, caused the Dounreay estimate to be revised upwards three times in four years. The present estimate was 38% higher than the original, and this did not result from any big policy change.

The report goes on: 'The least satisfactory feature of this record appears to be the way expenditure drifted upwards at Dounreay. Inadequate control here is believed to have cost £500,000, and your committee are glad to note that the authority have modified their systems as a result of this experience.'

Boby's to Double Their Design-Research Unit

DESIGN and research unit of the 85-year-old water treatment firm, William Boby and Co. Ltd., Ricksmanworth, Herts, is to be doubled shortly. A second storey is being added to the drawing office.

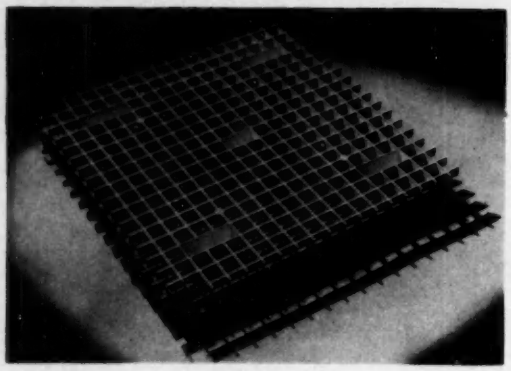
Boby's are a three-generation firm with equipment made in the days of the grandfather of the present managing director, Mr. Michael Boby, still in use. In recent years they have acquired international recognition in a new field—electrodialysis. The company has orders worth £500,000 in hand. A recent large Air Ministry contract has been received for two complete desalting plants.

European Drug Industries Meet in Paris

REPRESENTATIVES of the pharmaceutical industries in five of the countries outside the Common Market—Austria, Denmark, Great Britain, Sweden and Switzerland—were present at a recent meeting of International de l'Industrie Pharmaceutique des Pays de la Communante Economique Europeene (G.I.I.P.).

Subjects discussed were: health legislation; social security; patents; economic problems; and pharmacopoeias. British representatives were C. C. Stevens (I.C.I. Pharmaceuticals Division), A. Duckworth (secretary, Association of British Pharmaceutical Industry) and J. M. Kirkness (deputy-secretary, A.B.P.I.).

New Polythene Packing Material for Cooling Towers



Poly-Grid packing grid moulded to measure 3 ft by 3 ft square, incorporating ¾ in splash strips

TWO more large Counterflo induced draught cooling towers which are being supplied by Head Wrightson Processes Ltd. for the Shell-Petrochemicals site at Carrington will incorporate a new plastics packing method. These Head Wrightson-Fluor cooling towers, with concrete shell and structure, are equipped with the Poly-Grid packing, which can be made from either high density polythene or high impact polystyrene, both of which are resistant to chemical attack and decay. Polystyrene is the less expensive material, but in certain circumstances h.d. polythene is superior.

The Poly-Grid packing is moulded in 3 ft by 3 ft grids with 2 in sections having ¾ in splash strips along the top of each rib with 2 in spacing between the decks by means of five tapered supports. The many tens of thousands of grids required for the Shell cooling tower will be manufactured from Carlona, the Shell h.d. polythene; each grid for this project weighs about 4 lb.

Poly-Grid packing offers the designer the practical advantages of the splash type packing with high operating efficiencies. It is suitable not only for use in new installations but also for replacement of some or all of the wooden packing in existing cooling towers of all types. With this new material it is possible to increase the cooling capacity of the tower already installed by providing material which does not suffer from the deterioration problems of certain thin timber lathes.

Poly-Grid can, of course, be used in the natural draught towers and Head Wrightson Processes, a subsidiary of Head Wrightson and Co. Ltd., 20 Buckingham Gate, London S.W.1, have already received many orders and inquiries for the use of Poly-Grid in this type of Head Wrightson tower as well as for various new projects, and installations that are being renovated.

Sunderland Firm to Produce Pressure Vessels and Heat Exchangers

NEW premises at Crown Works, Sunderland, provide first-class facilities for the design and production of pressure vessels and heat exchangers by Steels Engineering Installations Ltd. A comprehensive service can now be given from within the one organisation.

Basically they have been designed to meet the needs of the petroleum and chemical industries, but they will also cater for several other industries, including foods, fats and beverages and gas production, etc. A pyramid plate rolling machine has a wide range of capacities. It will, for instance, roll ½ in thick, 10 ft wide stainless steel plate down to a diameter of 18 in and a 2 ft by 5 ft 6 in mild steel plate to a minimum inside diameter of 2 ft 6 in. There is no maximum limit.

The production shops have been designed to give a fast and economic throughput of vessels and exchangers. They comprise three main bays; one measuring 150 ft by 40 ft is the plating shop where plates for pressure vessels and heat exchangers are manipulated. In an adjacent bay, 150 ft by 30 ft tube bundles and all smaller parts for heat exchangers will be assembled or fabricated and in the remaining bay, which is higher than the other two, the pressure vessels and heat exchanger shells are welded and the various prefabricated sections are brought together for assembly and testing.

A template shop, in front of the heat exchanger shop, will provide wooden templates for such components as tube plates, dished head blanks and pads and within this shop is a dark room for X-ray films.

Nickel Steel Valves for Ethylene

UNDERGROUND pipeline transfers ethylene gas from the Esso Refinery in Linden, New Jersey, to Hercules Powder Co.'s polythene plant some 20 miles away. The gas is reduced in pressure (from 600 p.s.i.) for more convenient handling. Because this cut in pressure drops the temperature of ethylene to −150°F, valves cast in 3½% nickel alloy steel have been used. (*Inco-Mond Magazine*, No. 10.)

Normalised and tempered castings in this material meet an impact strength requirement of 15 ft-lb Charpy Keyhole at −150°F. About 20 lubricated plug valves varying in size from 2 in to 6 in have been supplied for the meter and regulating station (by Walworth Co. of New York).

In a compact unit, each valve combines a thrust ball bearing housing and a sealed stuffing box. This ball bearing unit is reported to control accurately the upward thrusts of the plug caused by line and lubricant pressures. Walworth prepare a special lubricant to serve in the temperature range created by the ethylene which reduces friction in the operation of the plug and tightly seals-off ethylene leakage when the valve is closed.

Cooling Fluid For Electric Equipment

A NEW cooling fluid, Montosile, for use in computers, control systems, and other types of eletronic equipment has been developed by Monsanto Chemicals Ltd.

Montosil E has been developed for use in electronic systems capable of withstanding very high temperatures, such as those installed in high speed aircraft and rockets. The problem of controlling operating temperatures in such devices has been complicated in the past by the limited choice of suitable cooling fluids.

Montosil E is said to have excellent dielectric and thermal properties and good lubricating and hydraulic characteristics. The fluid has adequate viscosity throughout the temperature range between minus 65°F and 400°F, and its pour point is below −100°F.

Chemical Exports to South America

A LONG list of raw materials for the manufacture of products for combating agricultural and cattle pests can now be imported into Uruguay at the exchange rate of Ur. $2.10 to the U.S. dollar in accordance with a decree establishing new import exchange rates for first-category goods.

The Chilean government has published a permitted import list giving the amounts of deposits required. The old list of prohibited imports is abolished and in effect all goods may now enter Chile freely, subject only to the lodging of the appropriate deposit.

Factories Act in Force in December

THE Factories Bill received the Royal Assent on 29 July. The new act amends the Factories Acts, 1937 and 1948, and makes further provisions as to the health, safety and welfare of workers in factories and other places subject to the Factories Acts.

The act does not come into operation at once. The Minister of Labour is given power to bring the provisions into effect by order, and to appoint different days for different purposes.

In a Parliamentary written answer the Minister, Mr. Iain Macleod, indicated that he intended to make an order bringing about half of the provisions into operation on 1 December 1959. Certain of the other provisions—for instance the sections on cleanliness, dangerous substances, safe means of access and place of work, dangerous fumes, washing facilities, first aid—will involve preparatory work being done by the employers and some extra time must be allowed for these purposes.

New Surfactant Gives Encouraging Results

ENCOURAGING results are being given in trials with detergents based on the alternative surface-active material mentioned by the Standing Technical Committee on Synthetic Detergents, the Minister of Housing and Local Government, Mr. Henry Brooke, stated in a written Parliamentary answer.

He said the new detergent was being marketed in the Luton area. It was still not possible to say definitely that the new material solved the problem, but tests so far showed that a higher proportion of detergent was being removed during treatment and there had been a marked reduction in the content of surface-active material in the River Lee several miles below the sewage works.

Million Gall. Tank for Phosphatic Fertilisers

A NEW idea in phosphoric acid storage tanks—a reinforced concrete structure with a capacity of over a million gallons of phosphatic fertiliser solution—has just been completed at U.S. Industrial Chemical Co.'s Tuscola, Illinois, 100-ton-per-day wet-phosphoric acid plant. This outsize storage tank goes into service this month.

The tank will increase the plant's storage capacity by 1½ months' production; ensuring formulations of a steady supply of raw material for their late winter and early spring compounding season.

Built by Preload Co. Inc., of New York, the tank is one of the largest ever constructed for phosphoric acid storage. It measures 100 ft. in diameter by 21½ ft. high. The reinforced concrete tank was built up in place on a wire mesh form and pre-stressed in the construction (unlike most phosphoric acid storage tanks which are steel lined).

New Filter Process for Cement Slurry Uses Nylon Cloths

A UNIQUE process that uses filtration to remove a substantial proportion of the water content from cement slurry before kiln drying has been developed by British Portland Cement Manufacturers Ltd. The filter presses are clothed with nylon fabric.

This is the first use of filtration in U.K. cement manufacture and it is thought to be the first cement process in the world to use plate and frame presses, although rotary vacuum filters are used in some countries. The system was developed by B.P.C.M. engineers at the company's Shoreham Works. After chalk has been mixed with water and reduced to a fine particle size, clay is added and the mixture subsequently fed into kilns where the heat dries it out and causes a chemical reaction between the components.

The use of filtration to remove some excess moisture before kiln drying gives possibilities of increasing output from existing plant, and of enabling a reduction in the amount of coal per ton of material. It was decided to use plate and frame presses rather than rotary vacuum filters since the better moisture extraction would more than outweigh the disadvantages of the process not being continuous. Engineers were favourably impressed by the excellent results being achieved with nylon cloths on presses of this type in the potteries and collieries.

Today, after a prolonged period of trial, adaptation and modification, more than half the water in the slurry is removed by the process, the moisture content being reduced from about 42% to between 18 and 19%. This compares with the figure of 22% generally achieved with rotary vacuum filters in the U.S. The Shoreham installation consists of three 48-in 80-leaf presses operating at a filter pressure of 120 p.s.i. Each press is dropped about 17 or 18 times during a period of 24 hours and deposits somewhere around 10 tons of cake at a time so that the capacity of the plant is between 3,000 and 4,000 tons per week.

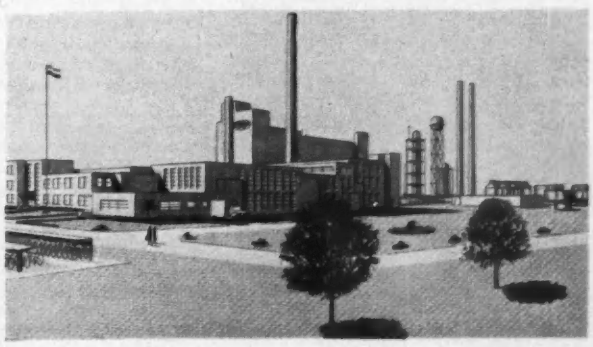
Water pours out of one of the filter presses which, clothed with nylon, are used for dewatering cement slurry

It was found that the most satisfactory results were achieved with a 12½-oz/sq yd continuous filament plain weave nylon fabric. Although the initial cost is high, this has a long life as a result of nylon's great tensile strength, outstanding abrasion resistance and immunity to rotting and economy in use. The average initial life of a nylon cloth was found to be 2,000 pressings and that its total life after repairs was 3,000 pressings during which time it handled about 375 tons.

Graphite Duty Exemption Application

The Board of Trade are considering an application for the exemption from duty of natural graphite, crystalline, in thin flakes containing not less than 85% of carbon and having a density of less than 60 grammes per 100 c.c. Requests for a statement of the case, with an undertaking to treat the information as confidential, should be addressed in writing to the Board of Trade, Tariff Division, Horse Guards Avenue, London S.W.1, not later than 4 September.

Du Pont's Orlon Plant in Holland



Artist's sketch of a projected Du Pont plant for Orlon acyrlic fibre at Dordrecht. Initial annual capacity will be 15 m. lb. Construction will start later this year and production should begin in 1961

Gallenkamp to Acquire J. W. Towers of Widnes

AN amalgamation between two important makers of scientific apparatus, instruments and equipment and laboratory furnishers is to take place. This follows agreement in principle for the acquisition of J. W. Towers and Co. Ltd., Widnes, by A. Gallenkamp and Co. Ltd., Sun Street, London E.C.2.

Both businesses have a record of successful progress and long-service staff relations. Gallenkamp were established in London in 1880 with interests mainly in the south of England and overseas, and Towers in Widnes in 1882, with interests mainly in the north.

Both companies now have considerable manufacturing facilities which in many respects are complementary. Jointly, the sales, technical and distributive organisations will be able to offer to laboratories throughout the U.K. and overseas a most comprehensive range of products and a service that it is claimed will be 'second to none.'

Because of the complementary nature of the business and the fact that there is no significant overlap in the territories of main interests, it is envisaged that with the full co-operation of the staff of both companies, a successful merger, without redundancy of personnel, can be achieved.

J. W. Towers will continue to trade as a separate company and Mr. J. S. Towers has agreed to hold office as managing director for a period necessary to ensure a smooth co-ordination of interests.

Woodall-Duckham Take Over Nordac

WOODALL-Duckham Ltd. have acquired the whole of the share capital of Nordac Ltd. by the issue to the shareholders of 185,189 ordinary shares of 5s each in Woodall-Duckham.

Nordac specialise in the supply of equipment for the principle of submerged combustion which has many applications in industry. They also carry on an extensive business in anti-corrosion lining of chemical plant at their works at Uxbridge.

Nordac Ltd. will operate as a separate company within the Woodall-Duckham group.

MacCleaster Chemical Join Powell Duffryn Group

CORY Brothers and Co. Ltd., who are in the Powell Duffryn group, have acquired the share capital of MacCleaster Chemical Co. Ltd.

The MacCleaster Co. will continue to operate under their own name and the present directors, Mr. N. R. MacCleaster and Mr. R. A. L. Thornton, will remain on the board. Additional directors appointed are Brigadier S. J. L. Hill, D.S.O., M.C. (chairman), and Mr. John Wm. Davies, both also directors of Cory Brothers, and Mr. J. W. Franklin. The company's address will be 8 Great Tower Street, London E.C.3; telephone MANsion House 4555.

MacCleaster Chemical Co. Ltd., a private company formed four years ago, manufacture anti-corrosion composition. It is intended to expand the company's production facilities and to provide a comprehensive advisory service.

Harwell Course

The second 1959 course on the uses of radioisotopes, planned for company directors and senior executives, will be held at Harwell from 29 September to 2 October. Fee for the course is £40 and application forms can be obtained from the Registrar, Isotope School, Harwell, Berks.

Fisons Form New Fertiliser Company in Canada

A NEW fertiliser company, Hy-Trous Company of Canada 1959, has been formed in Canada by Fisons Ltd. in association with Albatros Superfosfaatfabrieken N.V. of Utrecht, with whom all Fison's overseas fertiliser companies are jointly owned. The new company is at Cornwall, Ontario, and takes over the assets and goodwill of a family fertiliser business Hy-Trous Co. of Canada.

Fisons and Albatros already own one Canadian fertiliser company, International Fertilizers, founded in 1930, with which Hy-Trous will be run in close co-operation. International Fertilizers operate granulating plants at St. John, New Brunswick, and Wolf's Cove, Quebec.

In the pharmaceutical field in Canada, Fisons are represented by Fine Chemicals of Canada and in the agricultural and industrial pest control market by Fisons (Canada).

R.I.C. Members See I.C.I. Polypropylene Work

VISITORS from the London Section, Royal Institute of Chemistry, to I.C.I.'s Plastics Division, Welwyn Garden City, recently examined the company's isotactic polypropylene, Propathene. Also seen at these research laboratories which employ 2,000 persons, was the semi-technical butadiene copolymer plant, where emulsion polymerisation equipment is available together with a spray drier instrumented for production of powders.

U.K. Sulphuric Acid Consumption

Consumption of sulphuric acid in the U.K. in the second quarter of 1959 was 603,221 tons—compared with 538,649 tons in the corresponding quarter of 1958.

SULPHURIC ACID AND OLEUM
(Tons of 100% H_2SO_4)

1 April to 30 June	Chamber and Tower only	Contact only	Chamber, Tower and Contact
Stock 1 April 1959	22,973	78,864	101,837
Production	99,670	493,187	592,857
Receipts	17,573	24,460	42,033
Oleum feed ...	—	—	—
Adjustments ...	−135	+227	+92
Use	68,448	306,883	375,331
Despatches ...	48,743	214,423	263,166
Stock 30 June 1959	22,890	75,432	98,322
Total capacity represented ...	142,950	588,400	731,350
Percentage production ...	69.7	83·8	81.1

CONSUMPTION
1 April to 30 June

Trade uses	Tons 100% H_2SO_4	Percentage of Total
Accumulators	3,029	.50
Agricultural purposes ...	589	.10
Bichromate and chromic acid	4,532	.75
Bromine	4,104	.68
Clays (Fuller's earth, etc.)	2,896	.48
Copper pickling	653	.11
Dealers	4,142	.69
Drugs and fine chemicals ...	5,187	.86
Dyestuffs and intermediates	24,599	4.08
Explosives	2,965	.49
Export	902	.15
Glue, gelatine and size ...	98	.02
Hydrochloric acid ...	13,080	2.17
Hydrofluoric acid	3,277	.54
Iron pickling (incl. tin plate)	29,421	4.88
Leather	993	.16
Lithopone	3,665	.61
Metal extraction	757	.13
Oil refining and petroleum products	15,657	2.59
Oils (vegetable)	1,902	.31
Paper, etc.	2,028	.34
Phosphates (industrial) ...	580	.10
Plastics, not otherwise classified	11,585	1.92
Rayon and transparent paper	55,845	9.26
Sewage	3,323	.55
Soap, glycerine and detergents	29,526	4.89
Sugar refining	119	.02
Sulphate of ammonia ...	65,412	10.84
Sulphates of copper, nickel, etc.	7,539	1.25
Sulphate of magnesium ...	37	.01
Superphosphates	144,253	23.91
Tar and benzole	6,947	1.15
Textile uses	2,902	.48
Titanium dioxide	99,035	16.42
Unclassified	51,642	8.56
Total	603,221	100.00

NOTE—These summaries exclude all Government plants.

RAW MATERIALS

Tons	Pyrites	Spent Oxide	Sulphur: Imported	Sulphur: Recovered, H_2S and Filter Coke	Zinc Concentrates	Anhydrite
Stock 1 April 1959	152,212	97,649	65,530	7,386	79,393	10,884
Receipts	65,849	52,789	71,552	10,479	33,218	190,357
Adjustments	+1,731	−89	−702	+279	+373	—
Use	75,685	54,412	78,294	12,245	49,094	195,065
Despatches *	1,449	194	4,976	14	—	—
Stock 30 June 1959	142,658	95,743	53,110	5,885	63,890	6,176

* Including uses for purposes other than sulphuric acid manufacture.

GAS-LIQUID CHROMATOGRAPHY

P. G. W. Scott Discusses Instrument Maker's Viewpoint

In two specially contributed articles, Mr. P. G. W. Scott of W. G. Pye and Co. Ltd. and Dr. J. Haslam of the I.C.I. Plastics Division, discuss the development of gas liquid chromatography from the manufacturer's and user's viewpoint respectively.

Last year, the highly sensitive argon chromatograph became commercially available, since when Pye have sold 300 models. The most recent development, now going into production, is an integrating amplifier that electronically integrates the signal from the detector and feeds a potentiometric recorder with the integrated signal. Mr. Scott expects that the future trend will be towards the application of GLC in the control of chemical plant and processes; from that, perhaps the complete automation of continuous processes with GLC process analysers in control.

GLC has proved to have a greater influence on the separation of volatile organic substances than any other single development in analytical chemistry. This is the view of Dr. Haslam, a leading analyst in the plastics field. The method provides information immediately of depolymerisation products and has, in fact, so revolutionised older methods of gas-analysis that many are now said to be on their way out.

OFTEN the first description of a new analytical technique by its inventors appears in print many months or years before an instrument embodying the principles of the technique is available commercially. There are many reasons for this delay, the obvious one being that some evaluation of the potential market for such an instrument must be made and this is, for an entirely new technique, a necessarily slow process. A less obvious but equally important reason is that a large amount of development and production engineering is usually necessary before a working laboratory prototype becomes a finished instrument.

During development work the original invention may undergo considerable modification to produce better performance which will make the finished instrument a better commercial proposition. When an analytical technique is well established, advances in its practice may be made by academic and industrial workers and it will then depend upon the flexibility of the instrument manufacturer how long modifications or complete redesigns of current apparatus take in order to keep abreast of current trends.

Work Since 1952

In the field of gas chromatography this pattern of events has been followed, the first published application of gas-liquid chromatography (GLC) by James and Martin in 1952(**1**) preceding by some years the first commercially available instrument. In the years since 1952 much research has been devoted to improvements in apparatus and technique, and many applications of gas chromatography have been described for a wide range of practical chemical problems.

GLC Theory and Its Application. Since GLC is a separative process, the prime objective of the experimenter is to produce a chromatographic column with the best separating efficiency; many workers have developed theoretical treatments of the process in order to predict the ways in which better column efficiency can be achieved. In 1956 van Deemter *et al.*(**2**) arrived at an expression for column efficiency by considering that the various factors which could affect efficiency were as follows:—

(1) Diffusion of solute in the gas phase due to non-linear passage through the packed column (eddy diffusion).
(2) Molecular diffusion of solute in the gas phase.
(3) Resistance to transfer of solute across the liquid-gas interface (mass transfer effect).

The expression they derived related these factors to the "height equivalent to a theoretical plate" (H) in the following way:—

$$H = 2\lambda d_p + \frac{2\gamma D_g}{u} + \frac{8\mu K d_f^2}{\pi^2 (1+\mu K)^2 D_l} \cdot u$$

where λ and γ are constants
D_g and D_l = interdiffusion coefficients of solute in the gas and liquid phases,
d_p = diameter of support particles,
d_f = solvent film thickness.
μ = volume ratio of liquid and gas phases,
K = partition coefficient,
u = linear gas velocity.

Since for maximum column efficiency H should be a minimum, examination of the terms of the above equation yields the following conclusions:—

(1) the support particle diameter, d_p, should be small,
(2) diffusion of solute in the gas phase, D_g, should be kept small by using a carrier gas of large collision cross-section,
(3) H will be decreased by using a small weight of solvent, since if K is large the third term in the equation is proportional to d_f^2/μ both of

P. G. W. Scott, B.Sc., A.R.I.C., author of this article, is chief chemist of the Chemical Instrumentation Department of W. G. Pye and Co. Ltd., Cambridge

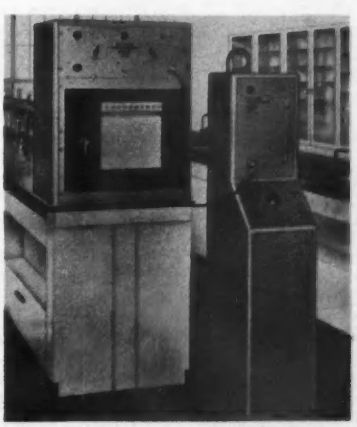


Fig. 1. Pye argon chromatograph

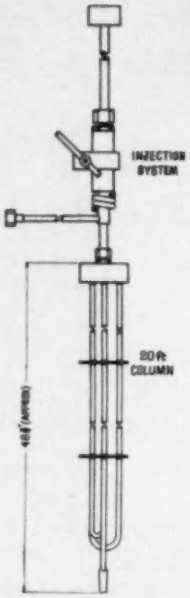


Fig. 2. Long column unit with attached closed injection system

which depend upon the weight of solvent.

In order to comply with requirement (3), very small solute loads must be added to the column and this will necessitate using a very sensitive detector. Of the few detectors possessing extremely high sensitivity the argon ionisation detector, described by J. E. Lovelock in 1958(3), has been developed commercially and, incorporated in the Pye argon chromatograph, widely used in many parts of the world. The detector also possesses the advantage of using argon as carrier gas, which has a high collision cross section thereby reducing molecular diffusion of solute in the column.

The Argon Ionisation Detector. The argon ionisation detector consists of a cylindrical brass ionisation chamber with a specially designed electrode in the centre of the chamber insulated from the body. A radioactive radium D source enclosed in foil is attached around the inside of the chamber. An inlet and exit for the column effluent is provided. A high d.c. voltage is applied to the detector, the central electrode or probe being positive.

In operation, argon enters the chamber and a small number of molecules are ionised by collision with the α-particles emitted by the radioactive source. The electrons produced by the ionisation are accelerated across the chamber by the high applied potential and can by collision transfer energy to argon molecules. The amount of energy available under normal operating conditions is sufficient to produce meta-stable argon atoms, which have a relatively long lifetime. If the applied potential is sufficiently high an electron can, before reaching the probe, acquire enough energy to produce several meta-stable argon atoms during the many collisions it must undergo, thus building up an appreciable concentration of meta-stable atoms in the detector. Since the ionisation potentials of most organic compounds are less than the excitation potential of argon, collision of the molecules of an organic compound with meta-stable argon atoms produces ionisation, with a consequent increase in current through the detector, whenever organic vapour enters the detector chamber.

The quantitative response of, and the effect of operating variables on the performance of the detector are described in detail by Lovelock (*loc. cit*) and may be summarised briefly as follows:—

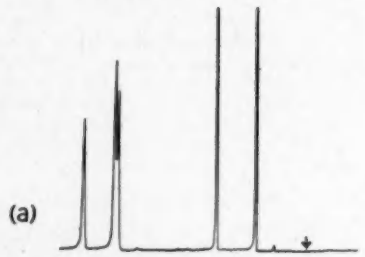
(1) the limit of detection is about 1 molecule of organic compound in 2×10^8 molecules of argon,
(2) under suitable conditions of temperature and voltage a linear increase in current through the detector with increase in solute concentration is obtained,
(3) the performance of the detector is not affected by small changes in pressure, temperature and gas flow rate.

Application of the Ionisation Detector. When details of the argon ionisation detector were first released in 1957, W. G. Pye and Co. were already producing a katharometer GLC apparatus which possessed a high sensitivity by current standards. It was recognised that in the argon detector was the basis for an instrument far in advance of any then available. Many months of development work were carried out by a team of workers at Cambridge in close liaison with Dr. Lovelock and in May 1958 the Pye argon chromatograph (Fig. 1) was exhibited for the first time at the 2nd GLC Symposium in Amsterdam.

Characteristics of the argon ionisation detector, i.e., extreme sensitivity, linearity and insensitivity to pressure, flow and temperature changes enabled the construction of a high performance instrument with the minimum of operational controls.

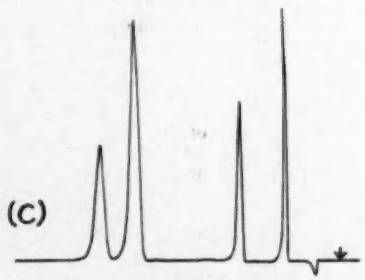
In the chromatograph, high column efficiencies (1,000 theoretical plates/ft.) are achieved using small diameter, uniform particles of support material (100-120 mesh celite), low percentage of stationary phase (5%) and small solute loads (0.025μl). With such high efficiencies a short column (4 ft.) can be used, operating at lower temperatures than conventional GLC equipment to produce the same retention volumes with much better separation. The heating requirements of the column/detector unit are now set by the reproducibility of retention volumes, and not by the effect of temperature variations on the detector. The addition of samples to the column can be made with a simple micro pipette, after temporarily disconnecting the argon carrier gas flow.

Fig. 3. Separation of a mixture of benzene, toluene, α-*m*-&*p*-xylene on columns with different efficiencies: calculated on the last peak, efficiencies are 47,000, 10,800 and 3,400 respectively. (d) Shows the integrated record produced concurrently with (c)

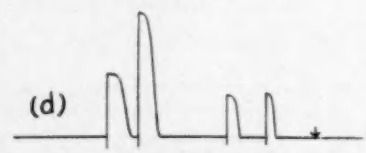


(a) 60 ft. capillary column, squalane stationary phase

(b) 20 ft. column, 5% apiezon A, stationary phase



(c) 4 ft. column, 10% squalane stationary phase



(d) integram of (c)

Greater Efficiency

In the past few months there has been an increasing demand for columns with greater efficiency than can be obtained with a 4-ft. column and a 20-ft. unit based on those described by R. P. W. Scott(4) has been produced, interchangeable with the 4-ft column (Fig. 2). With this column, efficiencies of 10,000 to 12,000 theoretical plates are readily achieved (Fig. 3b). Due to the pressure drop across the column, the inlet pressure of the unit is fairly high (30-40 lb./p.s.i. for gas flow rate of about 10 ml./min.) and a special closed injection system is used(5). This enables the sample to be introduced into the column without permitting air to enter and since for some labile materials it is an advantage to do this, this injection system has also been made available for use with the standard 4-ft. column (Fig. 4).

Quantitative Work in GLC. In addition to the pursuit of greater column efficiency much work has been devoted to other aspects of GLC, and in particular the problems associated with its use as a quantitative method. In common with many other detectors, the argon ionisation detector produces a signal which depends upon the concentration of a component in the gas stream. The chromatogram of a mixture of well resolved compounds takes the form of a series of peaks in which the amount of component present is directly proportional to the area under the peak.

Common methods currently used to determine peak areas are (1) by geometrical approximation from the recorded chromatogram and (2) electro-mechanical

integration by an integrating motor attached to the recording potentiometer. In the former method errors arise in the approximations applied when the peaks are not symmetrical and the latter tends to be complicated and expensive, and of limited accuracy.

A recent development, just going into production, is an integrating amplifier which electronically integrates the signal from the detector and feeds a potentiometric recorder with the integrated signal. The 'integram' so obtained resembles the very first gas-liquid chromatograms published by James and Martin, and the amount of component eluted is directly proportional to the height of the step on the integram. A feature of the integrating amplifier is that it incorporates a manual re-set device which returns the recorder pen to the original base line, or if desired does this automatically after each peak (Fig. 3d) or when a preset scale reading has been reached. This enables a full scale reading to be obtained for small individual components, and hence makes possible greater accuracy of measurement.

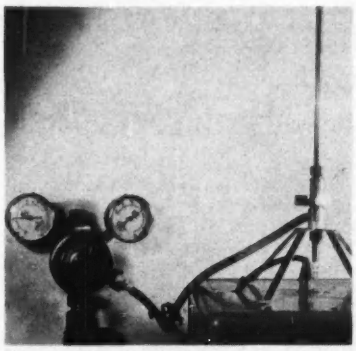


Fig. 4. Closed injection system for use with standard 40 ft. glass column

Present and Future Developments in GLC.—Much recently published work in GLC is concerned with the use of capillary columns, in which 0·01in bore tubes of steel, glass or nylon in lengths of 100ft or more coated internally with stationary phase, are used to obtain column efficiencies of 100,000 theoretical plates per 100ft for components emerging after only a few minutes. With columns of this size, minute sample loads must be used (1μg or less) so that an extremely sensitive detector is necessary. An argon ionisation microdetector has been designed, again by J. E. Lovelock(**6**), for use with capillary columns and the production of a complete capillary apparatus will not be long delayed.

As to the future, in the industrial sphere the emphasis is now beginning to shift to the application of GLC in the control of chemical plant and processes. Whereas at one time samples would be taken from the plant to the laboratory, it is now being considered desirable to install GLC apparatus in the plant, with automatic sampling to check on the progress of the reactions taking place. The next step will perhaps be complete automatisation of continuous processes with GLC process analysers in control.

In the laboratory more and more applications are being found for GLC in investigational work, especially in combination with instrumental techniques which reveal chemical structures, e.g., infra-red spectroscopy, mass spectrometry, etc.; much interest now centres in preparative scale GLC apparatus for this and other fields of study.

In conclusion there is no doubt that for many years to come the application of existing GLC techniques and the exploitation of new developments will provide a challenge to the ingenuity of experimenters and instrument manufacturers alike.

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Use of Gas Chromatography in the Plastics Industry

By Dr. J. HASLAM, I.C.I. Plastics Division.

IT IS probably true to say that gas chromatography, and in particular gas-liquid chromatography, has had a greater influence on organic analysis than any other single development in analytical chemistry during the past five years. The analyst has been presented with a better method of separation of volatile organic substances than most of those available to him in the past. Moreover, it has been shown that the principle of the test can be applied to the separation of quite small quantities of material. Analyst in the plastics industry have not been slow to develop the method and many interesting procedures have been put forward.

The basic raw material of many industrial polymerisation processes is a monomer and in such a case the gas-liquid chromatographic test has been found to be invaluable in the detection and determination of small amounts of impurities in commercial monomers, for example, in the detection and determination of methyl formate, methanol, acetone, methyl acetate, ethyl methacrylate and methyl-α-hydroxy isobutyrate in methyl methacrylate; of vinylidene chloride, *trans* 1,2 dichloroethylene, 1.1 dichloroethane and *cis* 1,2 dichloroethylene in vinyl chloride; of vinyl chloride, *trans* 1,2 dichloroethylene, 1.1 dichloroethane, *cis* 1,2 dichloroethylene and trichloroethylene in vinylidene chloride.

The analyst has to deal with polymers as well as monomers and in the past very useful information has often been obtained about many acrylic polymers by depolymerisation of the plasticiser free polymer *in vacuo* at 350°C, followed by physical and chemical identification of the depolymerisation products. This takes time and it has been found that most of the information required can now be obtained almost immediately by gas-liquid chromatographic examination of the depolymerisation products obtained from a given polymer or copolymer. For example, the depolymerisation products of the following copolymers readily yield evidence of the monomers used initially in their production: methyl methacrylate, ethyl methacrylate; methyl methacrylate, methyl acrylate; methyl methacrylate and styrene. Then again many polymeric substances may be subjected to attack by various chemicals and the products of that attack identified by gas liquid chromatographic test.

We have shown that this latter method is particularly useful in determining, for example, ethoxy groups in copolymers of methyl methacrylate and ethyl acrylate. This is accomplished by heating the suspect material with hydriodic acid in the presence of phenol. The products are purified and collected in normal heptane and to the mixture is added a solution of known amounts of methylene dichloride and ethylidene dichloride in normal heptane. The methylene dichloride and ethylene dichloride serve as markers. The products are now subjected to gas liquid chromatographic test when the individual constituents are eluted from the chromatographic column in the following order, methyl iodide, methylene dichloride, ethylidene dichloride, ethyl iodide and heptane.

Dr. J. Haslam, D.Sc., F.R.I.C., chief analyst of the Plastics Division, Imperial Chemical Industries Ltd., Welwyn Garden City

Using the procedure noted above we have been able to indicate whether a given polymer contains ethoxy as well as methoxy groups and moreover from the peak heights of the peaks in the chromatogram due to ethyl and methyl iodides and the corresponding peak heights of the markers also to deduce the relative proportions of the ethoxy and methoxy esters in the original copolymer. The principle of the method may be applied in connection with Zeisel determinations in numerous other organic substances. It is extremely useful because it gives evidence of the nature of the iodides produced in the Zeisel attack as well as their amounts.

Not all the problems with which the analyst in the plastics industry has to deal are concerned only with monomers and polymers; for example, he may be called upon to express opinions on the

nature of the solvents which may be present in a plastic adhesive. He will find it useful to isolate the solvent mixture and to submit it to a preliminary gas-liquid chromatographic test on a dinonyl phthalate column. This preliminary test will provide useful evidence of the presence or otherwise of various fractions of petroleum spirit, etc., i.e., which boil at different temperatures and of such substances as white spirit, naphtha, etc. This may be followed by gas-liquid chromatographic test of the mixed solvent on columns of quite different character, i.e., on a polar, tri-tolyl phosphate column, and a non-polar, paraffin wax column.

Organic solvents according to their character behave quite differently on the two columns and by finding out how the different constituents of a solvent mixture behave relative to an added marker such as benzene, the analyst will often enough size up solvent mixtures very quickly indeed. It is probable that these mixtures would be rather difficult to assess satisfactorily by the more conventional procedures ordinarily at his disposal. The method can be applied in many other situations not directly connected with the plastics industry. Indeed quite recently we were informed by a correspondent that the method might be of use to him in connection with the examination of solvents in insect cuticle waxes. It should be realised, however, that in the identification of some complex mixtures it is necessary to proceed even further. It may be necessary to freeze out constituents when they are separated by gas-liquid chromatographic test so that these separated substances are finally available for unequivocal infra-red identification. Up to very recently we required considerable amounts of the separated substances for this infra-red test but Anderson's work published recently in *The Analyst* has enabled us to adopt procedures which often permit of the ready infra-red identification of milligram amounts of separated substances. Moreover, it is true to say that the limit in this kind of identification has not yet been reached.

Method Has Uses Apart from Plastics

The method has been found to be extremely useful in a particular case where an unknown impurity was present in a commercial sample of ethyl acrylate. The impurity was separated by the method outlined and the separated substance examined in the gaseous condition alongside an authentic sample of isopropyl acrylate, which we suspected might be present from the chromatographic behaviour of the impurity. There was no doubt at all about the infra-red identification of the particular impurity. Then again we have found the gas-liquid chromatographic test to be of considerable help in assessing the general nature of mixed plasticisers.

In the past we have not found the direct infra-red examination of a mixed plasticiser containing, for example, such substances as chlorinated paraffin wax, phthalates and aryl phosphates, to be particularly trustworthy and have often had to isolate the alcohols used in the production of the phthalates in the plasticiser mixture before we could satisfactorily assess the whole. Moreover, the infra-red identification of mixed alcohols isolated in this way was by no means entirely satisfactory. More and more we find that gas-liquid chromatographic examination of the mixed alcohols is invaluable.

In addition to the above the analyst in the plastics industry will find the procedure extremely useful in the solution of all kinds of *ad hoc* problems. We have found no difficulty, for instance, in using the method to decide on the proportion of methyl cyclohexane in petroleum ether.

A short review of this kind would not be complete without reference to the use of gas-solid and gas-liquid chromatography in modern gas analysis. There is no doubt that many of our older methods of gas analysis are on the way out. Simple adaptation of the principles outlined has readily permitted us, for example, to determine very rapidly indeed the proportion of propane in propylene which would be far from easy by conventional procedures.

Ion Exchange Resins in Chromatography

THE use of ion exchange resins, in micro bead form, for the chromatographic separation of closely similar materials e.g., the rare earths or the amino acids, is now well established. This has been made possible by the availability, in recent years, of polystyrene and polyacrylic resins. These resins are mono-functional and uniform in composition and have enabled considerable developments to be made in the general scope and application of ion exchange processes.

For chromatography, two major types of cation exchange resins are available, namely, the sulphonic and carboxylic acid resins, while a limited number of tertiary amine and quaternary ammonium anion exchange resins are manufactured.

In use, these resins change from a hydrophobic to a hydrophilic condition and, consequently, take up a quantity of water which may be considerably more than the weight of the resin itself. This imposes a limit to the particle size of the materials which can be used for chromatographic purposes; the smallest being in the 200-400 mesh range. Even with this size the flow rates which can be realised are very slow. For this reason, although the finest bead sizes are normally the best for micro work, micro scale separations are frequently carried out using 100-200 mesh size materials. For work of a preparative nature an increase to the 52-100 mesh size may be advisable while large scale industrial processes normally require 14-52 mesh size resins because of the conditions dictated by hydraulic plant design. Experimental separations intended to form the basis of later industrial processes should, therefore, be repeated with industrial size resins.

The Permutit Co. Ltd., London, have for many years prepared special ion exchange resin materials for research and other specialised applications in addition to the standard grade materials supplied for water treatment and industrial processes. The company's experience in the manufacture and use of ion exchange materials has shown that, with rare exceptions, all laboratory requirements can be met by making available a range of cation (Zeo-Karb) and anion (De-Acidite) exchange resins in four particle size gradings: 14-52 mesh; 52-100 mesh, 100-200 mesh, 200-400 mesh. These resins are graded and supplied in the wet state—ready for use.

Inco Fellowship Marks Royal Tour

IN HONOUR of the Queen's and Prince Philip's visit to the nickel mines in the Sudbury area, Ontario, International Nickel have established a fellowship for the encouragement of the arts, humanities and social sciences. It will be called The Queen Elizabeth II Fellowship (The International Nickel Co. of Canada Ltd., Royal Tour 1959). The award will be a post-doctoral fellowship tenable for two years for Canadian citizens, who are holders of a doctor's degree. Research can be undertaken in chemistry or physics of metals, metallurgy, mineralogy, mining or geology.

D.S.I.R. Publishing Technical Digest Again

D.S.I.R. will shortly resume publication of its technical digests, which were last issued in 1957. Their object was to call attention to useful ideas appearing in technical literature.

Data Sought on Use of Chemical Reagents

AN exploratory committee set up in 1958 to study the possibilities of preparing specifications for chemical reagents with extremely low limits of impurities is anxious to obtain information about the limits to which impurities can be tolerated and the estimated annual consumption of reagents. These reagents are used for polarography or for trace analysis. All interested in the subject are asked to contact the secretary of the committee, Mr. W. J. Parker, 55 Oriental Road, Woking, from whom a special questionnaire can be obtained.

Represented on the committee are: Animal Diseases Research Institute; Association of Public Analysts; British Polarographic Research Institute; British Cast Iron Research Association; D.S.I.R.—Interservices Panel for Physicochemical Methods of Analysis; M.R.C. Department for Research in Industrial Medicine; Photoelectric Spectrometry Group; and Polarographic Society.

LABORATORY EQUIPMENT REVIEW

★

New Apparatus for Research and Industry

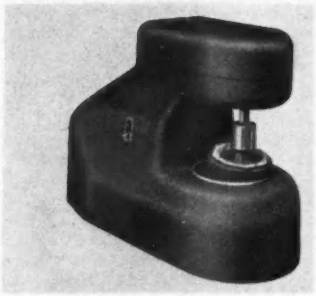
★

This annual survey of laboratory equipment features apparatus and instruments that have recently been introduced, redesigned or modified. It also includes equipment for pilot scale operations. For further details of individual items complete and return Reader Enquiry Service form on page 197.

★

Mortar and Pestle Grinder

In the electrically driven mortar and pestle grinder for the fine grinding of samples manufactured by **Herbert Alexander and Co. Ltd.,** Charmouth Street, Leeds, 11, mortar and pestle rotate in opposite directions, the mortar at 32



Mortar and pestle grinder

r.p.m. and the pestle at 96 r.p.m. The mortar is fitted into a hardwood holder which rests freely on the sponge rubber bed of the carrier. The mortar assumes an inclination to the horizontal plane under the pestle giving even grinding pressure and concentrating the sample under the pestle, the centre line of which is offset to that of the mortar. The pestle is instantly retractable for withdrawal of the ground sample. The machine is driven by a totally enclosed fractional h.p. motor and worm reduction unit. The mortar and pestle are of polished agate but alternative materials can be supplied. The machine may be converted into a mixer for general purposes in a matter of seconds by the use of a stirrer and bowl, which are available as extra attachments.

Chemical Pump

A recent development by **Apex Constructions Ltd.,** 15 Soho Square, London W.1, is the Apex 192 chemical pump which fills a need in research and process departments for a small inexpensive pump for pumping liquids, gases or solids in suspension at easily variable rates and without contamination. The pump operates by compression of rubber or other resilient tube between a pressure plate and a number of fingers which are moved in a sine movement by a cam. Tubes of various diameters can be used. Four sizes of pump are available with a flow range from below 10 c.c. a minute to above 9,000 c.c. The pumps can be supplied with a motor drive on baseplate or they are available as motor-driven model complete with a variable speed reduction unit. Advantages of this type of pump are: liquids and gases can be pumped without risk of contamination; the presence of suspended solids does not affect their performance; expensive corrosion-resistant materials are not necessary in the pump itself; varying rates can be easily achieved. Other recent developments by this company include extensions of their range of laboratory ball mills, including a less expensive form in which the ball mill pots are rotated on rubber-covered rollers. Developments in powder-mixing equipment include the fitting of an agitator bar to the model 165 Y cone blender.

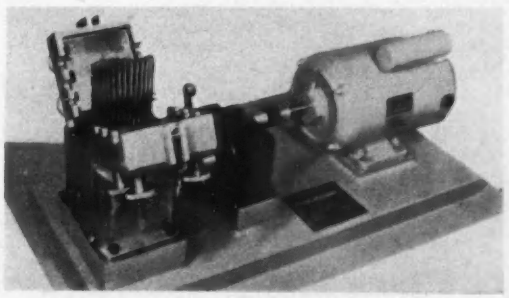
Pocket pH Meter

Quick pH readings can be made with a meter that weighs only 3 lb. with accessories and goes into a case measuring 3¼ by 6½ by 4½ inches. It is manufactured by **Analytical Measurements**

Portable pH meter

Ltd., Dome Buildings, The Quadrant, Richmond, Surrey. The case is waterproof and has a strap so that the meter can be hung round the neck or on the shoulder, leaving the hands free.

The meter is self-contained with batteries in a Bakelite case and is furnished with plastic tubes of buffer KCl solutions. It is scaled from 2 to 12 pH

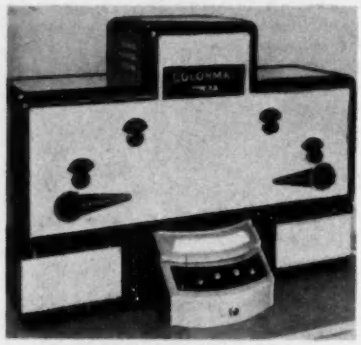


Apex 192 chemical pump

and a simple adjustment gives readings from 0 to 14. Accuracy of 0.1 pH is obtainable. The electrometer tube, switch and input connector are sealed in a single unit to ensure freedom from high-humidity difficulties. One-knob control and continuous reading features simplify operation for untrained workers.

Comparing Colours

The Colormat, type R, T or S, manufactured by the **Baldwin Instrument Co. Ltd.**, Lowfield Street, Dartford, Kent, has been designed for the easy comparison of colours of a similar composition. It consists of a highly stable



Baldwin Colormat unit

d.c. amplifier fitted with two vacuum-type photocells. The light source has two lamps fitted, one of the normal tungsten filament type and the other with a mercury tungsten filament to simulate daylight. In special cases a zenon-type lamp can also be fitted. Iris diaphragms are fitted for control of the level of illumination. Filters are fitted between the sample and the photocells to enable the complete visible spectrum to be covered in small bands as well as the relative high bands of the tri-colour series. There are three models, for reflection measurement of static samples, reflection measurement of moving samples and transmission measurement of transparent or translucent material under continuous manufacture. A difference of 0.1% between samples can be detected. In the static model a spring-loaded table enables samples of any thickness to be measured. Provision is also made for measuring powders without extra attachments.

Nitrogen Generator

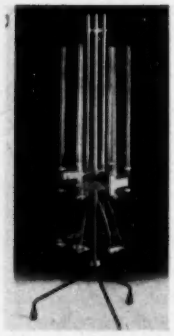
Pure nitrogen with a controllable hydrogen content is produced by the Nitroneal generator of the **Baker Platinum Division, Engelhard Industries Ltd.**, 52 High Holborn, London W.C.1. It reacts ammonia with air in the presence of the Baker catalyst, generating a gas completely free of oxygen and consisting of nitrogen and hydrogen, at a dew point of 40°F. The hydrogen content can be varied to meet changing requirements and can be maintained at any desired proportion between 0.5% and 25% within close tolerances. It is claimed that the unit produces gas many times cheaper than cylinder nitrogen. It is safe, fully automatic and portable.

Among other recent developments by the **Baker Platinum Division** is an integral-sheath thermocouple. There are ten types. The W.7 is designed for use under irradiation at temperatures up to 1,600°C and is suitable only for use under inert or reducing conditions and not under oxidising conditions. The sheath is made of Baker S.P. 70 alloy, the positive element of Baker 43 alloy and the negative element of C.P. platinum. The insulating medium is pure aluminium oxide. External diameter is 0.067 in. and maximum length 20 ft.

B.T.L. Redesign Their Titration Stand

Equipment from **Baird and Tatlock (London) Ltd.**, Freshwater Road, Chadwell Heath, Essex, includes a re-designed titration stand for six burettes, which comprises a rotatable spider to hold the burettes and feeder tubes, mounted on a vertical stainless steel rod which is fitted to a tripod vase with rubber feet. The three legs fit into a collar round the vertical rod, the rod and legs being held in place by Allen screws. The height of the rod can be adjusted.

The spider has six pairs of arms, each set of arms carrying a pair of polythene-coated spring clips to hold a burette and a label holder with a slip-on plastic



B.T.L. titration stand for six burettes

cover. It also carries six polythene-coated spring clips between the arms to hold the lower ends of the six glass feeder tubes and a second stainless steel rod fitted with a collar carrying six similar clips to hold the upper ends of the tubes. The feeder tubes are normally connected to reservoirs above the level of the stand in which the reagents are stored. The lower ends of the tubes are connected to aspirator-type burettes held in the stand.

The spider will rotate through 300°, with indexing at each 60° interval, enabling each burette to be brought into position in turn.

Pilot Dryer

Designed specifically to dry air and gases for transistor manufacture, atomic energy pilot plant, furnace atmosphere dewpoint control, stainless steel brazing and general process use, the Birlec pilot dryer weighs 75 lb. and is a readily portable unit for drying air and process gases on a pilot scale. It may be supplied with various desiccants. For most common applications, the desiccant material of widest value is activated alumina; for other requirements, molecular sieve adsorbent, silica gel or aluminium silicate may be preferred. The makers are **Birlec Ltd.**, Erdington, Birmingham, 24.

The operation of the dryer is simple. It is complete with two valves for the main flow, and two for the reactivation flow, two thermometers, pressure gauge, heater warning light and switch. For drying purposes, the unit is connected in circuit until the desiccant becomes saturated, whereupon it is removed from circuit and reactivated by a built-in heater system.

With a desiccant capacity of 0.25 cu. ft., the Birlec pilot dryer is basically a round-ended cylinder of diameter 9 in., and height 3 ft. 2 in. The reactivation temperature can be controlled at any desired level between 100° and 300°C. Reactivation heating takes some 2½ to 5 hours, and a cooling period of 2 to 3 hours is necessary.

Cabled Nylon Tubes

British Insulated Callender's Cables Ltd., 21 Bloomsbury Street, London W.C.1, in addition to their cabled copper tubes are now manufacturing a range of cabled nylon tubes. Typical applications include the remote monitoring of processes and equipment in chemical plants and oil refineries by pneumatic or fluid operated meters and other indicating devices.

The tubes, of which there may be 1, 3, 4, 7, 12 or 19 in a 'cable,' are identified by colour. They are laid up in electric cable fashion and sheathed overall with p.v.c. (polyvinyl chloride) or p.c.p. (polychloroprene). If desired they can be provided with steel wire armour protection.

Leak Detectors

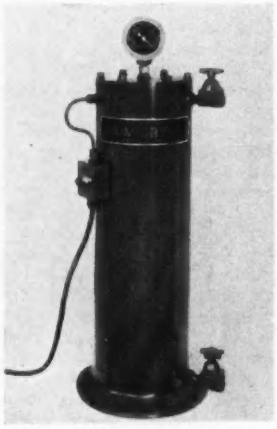
A method of detecting leaks which, it is claimed, would be imperceptible by any other practicable method is provided by the halogen leak detector manufactured by the **British Thomson-Houston Co. Ltd.**, Rugby. It is compact and portable.

Three forms of the detector are available—types HA, HM and HMB. They can be used either for the location of leaks in pressure or vacuum systems or for the detection of small concentrations of halogens in other gases. They are not quantitative indicators, but are said to be so sensitive that they can detect a leakage of Arcton (dichloro-difluoromethane) at the rate of one fiftieth of an ounce a year.

In the testing of tanks, pipes and pneumatic systems where there is no halogen-bearing compound a small amount of carbon tetrachloride or trichloroethylene is injected into the system as a tracer.

The basic principle of operation lies in the fact that an increase in the halogen content of the surrounding air causes a corresponding increase in the emission of positive ions from a heated platinum

electrode. The sensitive element consists of a pair of concetrically mounted platinum cylinders enclosed in a glass envelope. The inner cylinder is the anode: an internal heater raises it to a working temperature of about 800°C. The air to be sampled is drawn by a fan through the annular space between the two cylinders. With an anode-to-cathode potential of 250 volts d.c., under clean-air conditions only a very small positive ion current flows, but immediately air containing halogen vapour is drawn in, even if the concentration is as low as a few parts per million, the positive ion current is increased.



Humidryer by Burnett and Lewis

Dryers

A Humidryer specifically developed for laboratory use, by **Burnett & Lewis Ltd.,** Redhouse Industrial Estate, Aldridge, Staffs, is constructed from aluminium alloy materials and the lightweight assembly includes a vertical base-mounted adsorber tower with built-in electric reactivation heating elements, a charge of activated alumina pellets or, in special cases, molecular sieves, two isolating valves, indicating dial thermometer, supply lamp and a flexible 10 ft. t.r.s. supply cable, forming a self-contained easily portable unit. To reduce heat losses during reactivation, the adsorber tower is lagged externally, the insulating material being sheathed with aluminium sheet for appearance and protection.

The equipment is designed for intermittent drying duty where a period of at least eight hours is available between operating times for reactivating and cooling of the desiccant. Each unit has capacity for adsorbing 1 lb. of water when drying to dewpoints of 0°C. When charged with activated alumina, the minimum obtainable dewpoint is approximately −55/60°C. For dewpoints beyond this limit, the Lab-Humidryers are charged with molecular sieves, and, depending upon the reactivation procedure employed, dewpoints in the region of −75/80°C are obtainable.

The equipment as illustrated is suitable for drying all types of gases at pressures between atmospheric and 100 p.s.i.g.

In addition to numerous laboratory applications, dual adsorber versions of this equipment have been developed for industrial use, where a small but continuous quantity of nitrogen or hydrogen is required, e.g., in small sintering furnaces. The design also lends itself to pilot-size production schemes. Dual and triple tower Humidryers have been supplied for this purpose.

Density Gauge

The DGI density gauge, made by **Cawkell Research and Electronics Ltd.,** Scotts Road, Southall, Middlesex, is a compact portable instrument for the measurement of the density near the surface of materials in bulk.

The basic principle of operation is to measure the level of gamma radiation at a fixed distance from a radioactive source. This level of radiation is inversely related to the density of the intervening material so that the density can be derived from the radiation level. Facilities for cancelling out the possible errors due to decay of the source and the level of background radiation are provided.

The instrument consists of two units; a scaler and a density probe. It is hoped at a later stage to introduce further probes to extend the facilities provided; in particular a moisture density probe may be produced. Both units employ transistors throughout to ensure that they are as light as possible and to keep the current consumption down.

The scaler unit contains an interval timer covering the range 0-1 minutes with an accuracy of ±1%. The radiation level is presented jointly on a cyclo-counter and two meters. A maximum count of 9,999,999 is possible at a maximum rate of 1,000 counts per second.

The probe unit contains a metal geiger tube which will withstand rough handling, and a transistor pre-amplifier.

Miniature Instruments

A range of panel mounting 240° scale miniature instruments with 2 in. and 2½ in. dials by **Crompton Parkinson Ltd.,** Aldwych, London W.C.2, has been developed for use in the electronics industry.

Features of these d.c. moving-coil instruments, which are also available fitted with rectifiers for a.c. measurements, are: (1) The 2½-in. diameter instruments have a limit of inaccuracy of ±1%—as good as a full size switchboard instrument; (2) all the new instruments have 240° scales. This gives scale lengths of 3¼-in. and 4¼-in., in other words, twice the scale length of 90-100° short scale instruments of similar dial diameter; (3) nine 3½ in. scale instruments can be mounted in a 6½ in. square panel space.

Automatic Titrimeter

An automatic titrimeter has been designed by the **Doran Instrument Co. Ltd.,** Stroud, Glos, for use with their standard pH indicator, which has ranges of 0-10 pH, 4-14 pH and ±0-1,000 mV together with a high input impedance suitable for use with the normal calomel electrode system.

Provision is made for the remote

Doran automatic titrimeter

manual operation of the burette by 'fast' and 'slow' push buttons which enables complete titration curves to be plotted.

Titrations involving both rising and falling values of pH or MV may be performed. The range of anticipation of the end point, i.e., the changeover from fast to slow reagent addition, may be adjusted from zero to a possible maximum of about 1.5 pH or 150 mV.

A single solenoid-operated valve is used for reagent addition, the flow through the valve being either 'fast' or 'slow' according to the setting of the controller. The slow flow may be adjusted by means of a screwdriver slot control between a maximum of approximately 5 ml/sec. and a minimum of .02 ml/sec.

The accuracy of measurement is 0.1 pH or 10 mV according to the range in use, but greater accuracy is possible by 'buffering' the electrodes with a buffer solution of a value near that of the required end point. A variable speed stirrer is provided to ensure thorough mixing of the test solution and reagent, and reproducibility of titrations is ±1 drop.

The solenoid-operated valve, burette and stirrer motor are mounted on the side of the instrument case together with the electrode system, the test solution being contained in a 250 ml. beaker.

Dip Rods

One of the chief difficulties in making dip rods of aluminium and stainless steel has been the difficulty of obtaining readings, since most liquids run off the surface. **Dring and Fage Ltd.,** 150 Tooley Street, London S.E.1, have now applied a process which they claim gives perfect readings with all types of liquids, including water. They are making dip rods up to 40 ft. long.

Synthetic-Rubber-Based Paint

Detel Products Ltd., Stonefield Way, Victoria Road, South Ruislip, Middlesex, pioneers in chlorinated rubber paints, now offer a coating based on a new medium of modified synthetic rubber. They state that advantages of the new paint, MSRII, are that the film build is higher than that of chlorinated rubber and epoxy paints, with comparable protection, it dries with a better gloss, has less smell and is easier to apply.

Detel S/R grade is a high-duty solvent-resisting paint coating which may

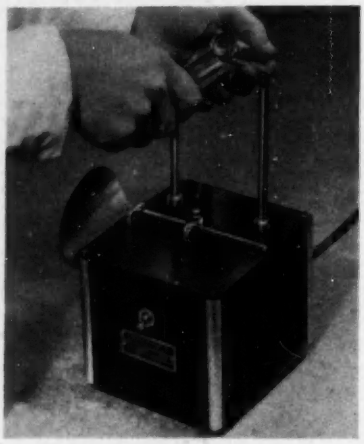
be applied by brush or spray and is resistant to a wide range of solvents, including trichloroethylene, perchloroethylene, toluole, xylole, white spirit, benzole, butanol, cyclohexanone, amyl acetate and naphtha. A catalyst, sent out with the paint, is normally used for best results.

Detelube is a dry lubricant paint with applications for scientific apparatus where lubrication by oils or greases is undesirable or impossible.

The company have also produced Atomicote, a chlorinated rubber coating designed for use in nuclear projects where there is a possibility of contamination of radioactive material.

Glass Tube Cutter

A product recently developed by **Electrothermal Engineering Ltd.**, 270 Neville Road, London E.7, is a glass tube cutter which will cut both hard and



Electrothermal glass tube cutter

soft glass tubes up to 3 in. diameter. No special skill is required: the tube is merely rotated against the cutting wheel and the resulting scratch mark is held against the hot wire, localised heat causing the tube to part neatly. An adjustable backstop makes sure that the scratch is cut accurately. Six standard cutting wheels are provided and are rotated out of the way as they become blunt.

Another new product is an electric melting point apparatus for determinations up to 360°C. A gas model is also available. It is claimed that fast heating and cooling cycles allow for more determinations per day than with any other apparatus. A clear-view optical system allows changes taking place before, during and after melting to be observed in detail without distortion.

The principle of operation is one in which an electrically heated block accepts up to three capillary tubes and the bulb of the thermometer, which should be dipped in colloidal graphite to obtain optimum heat transfer.

Permanently Filled Graduations

Treamic is the new registered trade mark of **H. J. Elliott Ltd.**, Treforest Industrial Estate, Pontypridd, Glamorgan, for a process giving permanently filled graduations on their pipettes in the E-Mil Gold Line range. The process makes permanent the colour filling in etched graduations.

Their rapid dispensers have an improved method of adjustment with an interchangeable stopper on a polythene inner tube and other developments are burettes fitted with a plastics stopcock and improvements to their differential Beckmann-type thermometer.

An advance in safety pipette design is provided with the E-Mil adapter, which locks syringe to pipette with a twist. It is designed to cut initial and replacement costs, time of pipetting and cleaning and breakage risks.

Ultramicro pipettes have been designed for use in chromatography, flame photometry, micro-chemistry and micro-medical analysis.

Test Sieves and Shaker

Recent additions to the range of **Endecotts (Filters) Ltd.**, Lombard Road, London S.W.19, are test sieves manufactured entirely in stainless steel, in addition to the usual standard test sieves with brass rims and wirecloth of brass, phosphor bronze and mild steel.

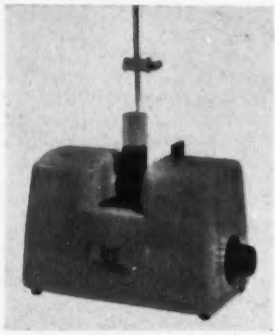
In addition the Endrock test sieve shaker has recently been re-designed. It will carry seven full-height or 13 half-height test sieves of 6 or 8 in. diameter. The sieves are carried on a rubber-lined table and held firmly in place by a clamping plate which slides up and down between two vertical rods and can be secured at any desired height by two large wing nuts.

The sieve table does not rotate but is inclined at an angle of approximately 15° to the vertical axis of the machine. While the angle of tilt is constant the direction towards which the table inclines changes progressively in a clockwise direction. Coupled with the gyratory movement of the table there is an up and down movement with a frequency approaching 300 vibrations a minute at an amplitude of approximately 5/32 in.

Endrock test sieve shaker fitted with seven full-height test sieves

Titrator

The EEL titrator, from **Evans Electroselenium Ltd.**, Colchester Road, Halstead, Essex, is suitable for all colorimetric titrations, particularly those involving the use of complexones. Determinations of calcium, calcium magnesium, fluoride, sulphate, barium, etc., may be readily obtained without the difficulties and errors of visual end-point detection.



Titrator by Evans Electroselenium

The instrument comprises a photo-cell and light-source mounted in a single housing. A platform is provided between the two for containing the sample solutions and thorough mixing is obtained by means of a magnetic stirrer.

A recent development is the EEL titrator amplifier, which may be coupled to the EEL titrator and Unigalvo type 20 to provide for the micro-determination of chloride.

When silver nitrate is mixed with the sample containing chloride precipitation of silver chloride occurs until the end-point is reached, after which concentration of silver increases rapidly giving a change in reading between the silver electrode and the platinum electrode. By titrating a known volume of chloride a reading is obtained which corresponds to the exact end-point potential between the silver nitrate and chloride in solution. This is the reading to which all sample titrations are taken.

Small-Volume Regulators

Series 67 regulators, made by **Fisher Governor Co. Ltd.**, Airport Works, Maidstone Road, Rochester, Kent, are designed as an economical, efficient small-volume regulator free from vibration and chatter. They are particularly adapted to instrument air service, supplying operating medium pressure to pneumatic control instruments and may also be used in other applications such as air jets, air chucks and cylinders.

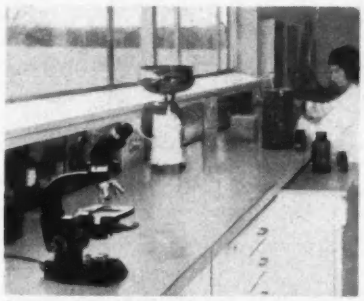
The reduced pressure set point is determined by the initial spring compression which at the start holds the inner valve open, allowing inlet pressure to flow through the port. Reduced or downstream pressure compresses the main spring by acting on the nylon-reinforced diaphragm through the drilled passage in the body. As the main spring is compressed the inner valve follows up to the shut-off position. A drop in downstream pressure causes the spring to overcome diaphragm pressure and open the valve feeding more pressure to the reduced system, maintaining a constant pressure.

Laminated Plastics Fittings

Recent applications of Formica in laboratories include benches and walls, including partition walling giving flexibility in design. Formica panels can be used with other materials so that the

areas where cleanliness is paramount can have special protection. Glass panels can be let into them to give improved lighting.

In one laboratory cupboards have been fitted on castors so that they can



Cupboards and bench top at the new A.I. Centre of Hampshire cattle breeders are veneered in dove grey Softglow Formica

be slid beneath the ordinary bench top. They are clipped on to a rail for stability. If the bench becomes cluttered with instruments or specimens any of the cupboards can be unclipped and moved out, their Formica tops providing an extra working area. **(Formica Ltd.,** De La Rue House, 84 Regent Street, London W.1.)

Pulse Oscilloscope

Furzehill Laboratories Ltd., Watford, Herts, make the 0.140, a laboratory oscilloscope for accurate measurements from d.c. to 10 Mc/s. It employs a 4-in. p.d.a. tube with an astigmatism control, giving an exceptionally sharp focus, the makers state. A green viewing filter with an edge-lit graticule is provided, with direct-coupled shifts for instantaneous positioning.

The Y amplifier can be used either d.c. or a.c. coupled and provides a maximum sensitivity of 15 mV/cm (peak). The X amplifier is designed to suit the time base, but is also available for external signals, with a band width of 1 **Mc/s.**

Radiation Pyrometer

A radiation pyrometer developed by the **General Electric Co. Ltd.,** Magnet House, Kingsway, London W.C.2, is designed to monitor surface temperatures of heated material by transmitting the radiation from the component to the heat-sensitive element in the pyrometer housing. It can be used to monitor surface temperatures in case hardening and similar induction tempering processes, as well as many other operations where heat is used.

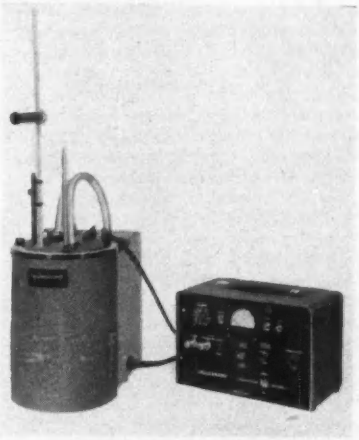
A hole is drilled through the centre of the mounting block through which a narrow pencil of heat radiation is allowed to pass to fall on the heat-sensitive element located in the centre of the pyrometer housing. The heat-sensitive element produces an electric current proportional to the heat radiation, and this current is led away to a light-spot galvanometer or millivoltmeter.

The temperature range of the radiation pyrometer, for open viewing through an angle of 40° through the standard silica window, can be considered to be from 200°C to just under 2,000°C. Temperatures higher than this can be measured provided a suitable probe is used.

Adiabatic Bomb Calorimeter

Complete calorimetric determinations can be made in 20 minutes with the automatic adiabatic bomb calorimeter, from **A. Gallenkamp and Co. Ltd.,** Sun Street, London E.C.2.

Two matched thermistors, one sensing the temperature of the bomb and the other that of its water-jacket enclosure, are continuously compared in a resistance bridge fed by low-voltage a.c. Out-of-balance in the bridge is amplified and then used to control instantaneous heaters in the water jacket to equalise the temperatures. The circuit uses the fact that the phase of the out-of-balance signal changes very rapidly when the bridge passes through the balance point and so is highly sensitive at this point.



Adiabatic bomb calorimeter

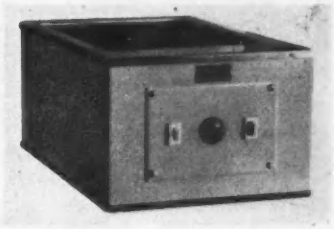
As the water jacket completely surrounds the calorimeter system determinations can be made independently of the ambient conditions.

Hearson Developments

Now engaged on an extensive programme of modernisation of their range of temperature controlled laboratory apparatus are **Charles Hearson and Co. Ltd.,** 68 Willow Walk, Bermondsey, London S.E.1. The company aims to produce a range of equipment designed in 'contemporary style,' reliable and available at reasonable prices.

Already this year they have introduced a new range of all-metal incubators, an improved model premature baby incubator, a Prothrombin bath, a range of slide drying hot plates and a new stainless steel general purpose water bath that is selling at £27 10s.

The new water-bath has a working space of 18 in. by 12 in. by 7½ in. deep. Overall dimensions are 23 in. by 14 in. by 9½ in. deep. Of matt polished stainless steel welded construction, the top is



Stainless steel water bath

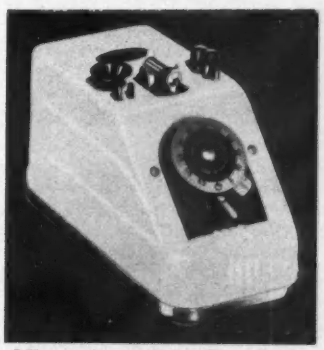
integral with the working space. The 1,000-watt element ensures even distribution of heat. The heater winder ensures long life by minimising the watts density per square inch. Fibre-glass slabs provide insulation. The hydraulic type thermostat gives accuracy of control to within ±0.5°C. from ambient to 100°C.

Lens Cleaning Tissue

The lens cleaning manual issued free by **J. Barcham Green Ltd.,** Hayle Mill, Maidstone, Kent, gives hints about cleaning lenses which they believe is not obtainable elsewhere. The manufacture and qualities of Green's 105 tissue are described.

Micro Mixer Mill

A micro mixer mill for rapid disintegration and mixing of minute quantities of substances to ultra-fine particle size has been introduced by **Glen Creston Ltd.,** 41 Church Road, Stanmore, Middlesex. Grinding and mixing is carried out in stoppered vials of 2 or 5 c.c. capacity, made of plastics, stainless steel, hardened tool steel or agate. As the vials are completely closed during operation there is no risk of contamination. Materials can be pulverised to less than 200 mesh in 2-3 minutes.

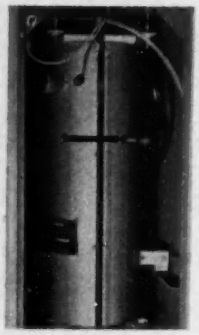


Micro mixer mill by Glen Creston

A sample mixer mill simultaneously introduced basically serves the same purpose but can cope with much larger quantities.

Isojacket for Pipe Chromatography Unit

Illustrated is the Isojacket made by **Isopad Ltd.,** Barnet By-Pass, Boreham Wood, Herts, for use with the Pye argon chromatograph. Isopad were asked to produce a heating device which would keep the ionisation column of 4 ft. length and 2½ in. diameter at any selec-



Isojacket in position on Pye argon chromatograph

ted temperature up to 250°C. with even temperature distribution over the whole length within 0.5°C, providing a temperature rise of 10°C. per minute.

The Isojacket incorporates two interleaved heating circuits, one catering for the required quick temperature rise while the other enables the temperature to be maintained at the selected level. The absolute evenness of heating required called for a series of experiments that resulted in the exact additional heating provided at the ends of the jacket, plus certain draught screens and cooling slots.

Scintillation Counter

The scintillation counter, type 661, made by **Isotope Developments Ltd.**, Beenham Grange, Aldermaston Wharf, nr. Reading, is a compact but highly sensitive radiation detector employing a 1 in. diameter photomultiplier tube. It is normally fitted with a sodium iodide crystal and can be supplied with lead collimator attachments. The counter can either be used by hand or mounted in a 'U' bracket for installation on an automatic scanning system. It can be fitted with thin sodium iodide crystals having beryllium windows for X-ray detection in diffraction studies and can take the place of a Geiger-Muller detector on standard X-ray diffraction equipment.

Rotary Drum Crystalliser

The laboratory rotary drum crystalliser, newly introduced by **Kestner Evaporator and Engineering Co. Ltd.**, 5 Grosvenor Gardens, London S.W.1, is suitable for pilot plant work. It is in all respects similar to the design of the Kestner full-scale rotary drum crystallisers used for the production of many metallic salts, such as sulphate of copper and nickel.

Warm saturated liquor is fed into the drum at one end and flows slowly to the other. Due to the rotation, a thin film of liquor forms on the side of the drum. Cooling water is supplied from the distributor and covers the outside of the drum in a thin film, rapidly cooling the film liquor; crystals are thrown out. A special scraper chain keeps the inside of the drum surface free from crystal build-up. The crystals and mother liquor overflow continuously from the outlet end, where they can be filtered or centrigued as needed.

Drum speed is infinitely variable, maximum speed being 20 r.p.m. and minimum speed 2.0 r.p.m. Angle of inclination is variably from 0° to 5° off the horizontal. Of stainless steel, the drum has a cooling surface of 18 sq. ft. Overall dimensions are: length 7 ft. 6 in., width 2 ft. 11 in., height 3 ft. 6 in.

Laboratory Stirrer

The improved RZR laboratory stirrer, manufactured by **Jones and Stevens Ltd.**, P.O. Box 35, Eastern By-Pass, Littlemore, Oxford, provides six ranges of speed by means of high and low-speed shafts that are brought into operation by turning the stirrer through 90°. Speed is continuously variable within each of six ranges.

H.R. Flow Inducer

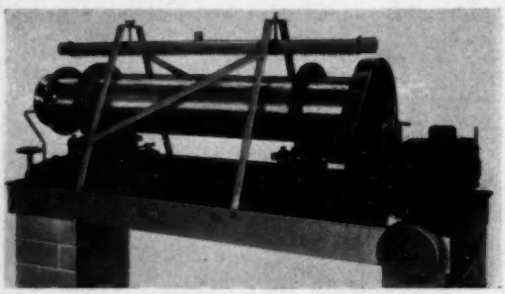
Available from the **Laboratory Glassblowers Co.**, Valley Works, Lane End Road, Sands, High Wycombe, Bucks, is the 'W.M.' H.R. flow inducer. Described in CHEMICAL AGE, 4 April, p. 585, this flow inducer is claimed to take the place of pump without any break in the pipeline. The flexible pipe is clipped to a multi-curved track which is locked into the machine when the central curve is concentric with a rotor bearing three rollers. As these rotate, the rollers pass over the pipe, flattening it against the track at the point of contact only. This 'flat' accordingly moves around the central curve of the track driving anything in the pipe before it. At the same time, the restitution of the pipe behind the roller creates a powerful suction, drawing in more fluid to be pushed by the following roller. Flow rate is variable from a few c.c. per minute to about 500 g.p.h.

Metabolic Shaking Incubator

The L.T.E. metabolic shaking incubator has been developed by **Laboratory Thermal Equipment Ltd.**, Greenfield, nr. Oldham, for biochemical and biological research which does not require manometric determination.

General design is as with the L.T.E standard water bath, with an outer case of heavy gauge aluminium and an interior of stainless steel thermally insulated by a minimum of one inch of glass wool. It is fitted with a shaking device, consisting of a sturdy frame with runners attached to the bath sides into which fits a 12 in. by 10 in. by 4 in. stainless carrier running in nylon bearings. The carrier and lid are so arranged that any gas atmosphere can be maintained above the metabolic system.

Temperature control is by a sensitive helical bi-metal regulator, giving a 40°C range of control from any pre-set origin. This operates in conjunction with a vacuum thermal delay relay.



Kestner laboratory rotary drum crystalliser

Fluorescent Screen for Paper Chromatography

Levy West Laboratories Ltd., Wembley Hill Estate, Wembley, Middlesex, report a new type of screen developed for use in large-scale paper chromatography in cases where the substance used has no absorption in the visible region, but absorbs strongly in the u.v. The screen is lit by u.v. of suitable wavelength passed through the chromatogram. The position of the substance is indicated by the lack of fluorescence of the screen in this region. By suitable choice of phosphor, the screens can be made to respond in various regions of the spectrum between 2,000 and 4,000 A.U.

Selection of screen binders allows the wet chromatogram to be laid directly in the screen for examination without damage to the screen. Screens are normally supplied on ¼ in. plate glass in sizes up to 20 in. by 9 in. For substances absorbing at wavelengths shorter than 2,900 A.U., the most suitable phosphor is zinc silicate which responds to wavelengths between 2,000 and 2,900 A.U. For substances absorbing in the near u.v. between 2,900 and 4,000, phosphors are chosen from the range of zinc and zinc cadmium sulphides.

Packaged Pump System

The newly developed pumpstand UP 01, available from **Leybold Vacuum Sales Ltd.**, 27-37 Broadwick Street, London W.1, consists of an equipment intended for ultra-high vacuum research incorporating the latest techniques in this field and utilising an omegatron and evaporator-ion pump. It is designed for processes in the range of 10^{-9} Torr (mm. Hg.). The ultra-high vacuum unit comprises a glass container with a capacity of about 1 litre, an ion-getter pump, a magnetic ball-joint valve, and a special ionisation gauge tube. The high vacuum unit comprises a mercury diffusion pump made of glass, two cold traps for liquid air and a special ionisation gauge tube. The fore-pump used for evacuating a fore-vacuum container is a whispering pump, F 2S, consisting of a glass part and a measuring tube.

Laboratory Filter with Pressure Pot

One of two small Metalfilters, designed by the **Metafiltration Co. Ltd.**, Belgrave Road, Hounslow, Middlesex, is a filter with pressure pot. Made of FMB stain-

less steel throughout it is intended to provide the necessary data for larger scale work. It can be used as a filter in its own right. The pressure pot has a capacity of about 1,400 c.c.; filter surface equals 1/24 sq. ft.

A pump operated laboratory filter is also available and can be used for pilot scale work and handles quantities of 20-25 g.p.h. with ease on suitable solutions. Filter surface equals 1/6 sq. ft.

First Production Model of Mass Spectrometer MS7

First production model of the MS7 mass spectrometer has recently been completed by **Metropolitan-Vickers Electrical Co. Ltd.,** Manchester. It has been designed for measuring minute impurities in solid substances using the spark ionisation technique. Materials which

Metrovick mass spectrometer MS7

have been analysed down to 0.01 p.p.m. with a prototype model include uranium, reactor grade graphite, germanium, selenium, silicon, gallium-arsenide, magnesium, titanium, tungsten, iron, copper, aluminium, tin and nickel-chromium alloys.

The MS7 is a double-focusing instrument of the Mattauch type, in which positive ions, representative of the sample composition, are produced when a high-voltage spark occurs between two electrodes of the sample placed close together in vacuum. After passing first through an electrostatic analyser and then through a magnetic analyser, the ions come to focus according to their mass, but irrespective of their initial energy as a series of lines on a photographic plate.

The method gives a general picture of the impurities in a solid. The whole mass range from 7-240, covering all elements, can be recorded in a single exposure of the plate. The spectra are said to be simpler and the elements easier to identify than with emission spectroscopy. Qualitative and semi-quantitative analyses can be carried out without extensive calibration.

Oxide Refractories

Purox oxide refractories, introduced recently by **Morgan Refractories Ltd.,** Neston, Wirral, Ches, are claimed to be unique because, it is said, "nowhere in the world today is it possible to obtain oxide refractories of such consistent high chemical purity." The range comprises: Recrystallised alumina, 99.7% Al_2O_3; Sintered pure alumina, 99.7% Al_2O_3; Impervious thoria, 99.9% ThO_2; Standard thoria, 99.9%, ThO_2; Pure magnesia, 98% MgO; Stabilised zirconia, 97% ZrO_2.

Metal Furniture Units

In collaboration with the manufacturers, Grundy Equipment Ltd., the **Griffin and George Group,** Ealing Road, Alperton, Wembley, Middlesex, have greatly improved the appearance and durability of their range of all-metal unit furniture. Projecting handles were a cause of annoyance, and a 'no-projection' feature has been incorporated in the new cupboards and drawers. A continuous flange offers finger-grip space over the full width.

Attention has also been given to the adjustment and alignment of the drawers by the use of a simple cam on the drawer track, which is easily accessible from the front of the unit. A rubber buffer on the track makes for quiet operation. Other features include the choice of many materials and finishes, 1½ in. shelf centres, piano-type hinges, adjustable feet, and flashing strips which conceal all fixings. The new metal furniture is interchangeable with existing installations.

Temperature Resistance Material

Kanthal super resistance material, produced by Aktiebolaget Kanthal, Sweden, and distributed by **Hall and Pickles Ltd.,** P.O. Box 116, Manchester 1, is now being recommended for element temperatures up to 1700°C. The product is claimed to surpass all resistance materials based on non-precious metals or on silicon carbide. It has the structure of a cermet and consists mainly of molybdenum-disilicide, the mechanical and electrical properties of which are modified by the addition of metallic and ceramic materials.

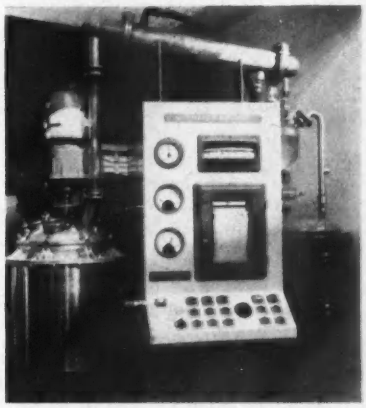
Photoconductive Cell for High Speed I.R. Spectroscopy

A new type of photoconductive cell designed for high-speed infra-red spectroscopy, including the analysis of gases, has been introduced by **Mullard Ltd.,** Torrington Place, London W.C.1. The cell (type ORP10) has an uncooled indium antimonide element and is sensitive to infra-red radiations of wavelengths up to 8 microns.

The indium antimonide cell has a wider response range in the infra-red than any other type of detector operating at room temperatures, with the exception of thermal devices such as the bolometer and thermopile. These, however, are too slow in response to be suitable for high-speed spectroscopy, whereas the response time of the indium antimonide cell is extremely short. Optimum scanning frequency is between 1 kc/s and 10 kc/s and frequencies of this order are easily within the scope of indium antimonide.

Pilot Resin Plant

An induction-heated pilot resin plant, suitable for producing all types of resins —alkyds, phenol formaldehyde, mela-

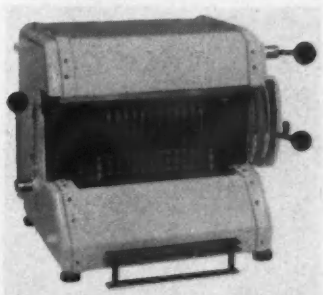


Induction-heated pilot resin unit

mine, polyesters—and for many esterification purposes has been designed by **L. A. Mitchell Ltd.,** 37 Peter Street, Manchester 2. It will be of interest to the research and development departments of large users of resins, or resin and plasticiser manufacturers. The resins made by this plant, due to elimination of local overheating, are of a much paler colour than with direct-heated plant.

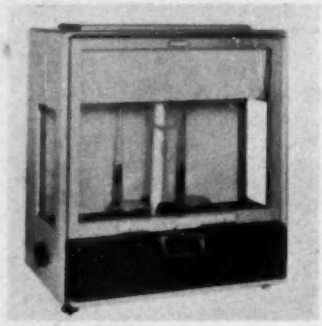
It is said that this plant cuts operating costs. During an experimental run it was established that the cost per gallon to produce a certain resin was 1.43d. on the induction-heated plant, against 3.1d. on a gas-fired kettle. This packaged plant is all-electric and fully automatic. It has two banks of heating coils, while the larger plant has three. The upper coils can be isolated, permitting flexibility of batch size and avoiding the risk of over-heating.

Automatic Dispenser for Multiple Titrations



Automatic dispenser for multiple titrations, by Nash and Thompson Ltd., Chessington, Surrey, can handle 12 tests simultaneously in the same time, or less, required for a single test by normal methods. (See C.A., 30 August 1958, p. 361)

Oertling Two-pan Balance



Model B11, which brings up to 18 the range of two-pan balances made by L. Oertling Ltd., St. Mary Cray, Orpington, Kent. It has a capacity of 200 g. and a sensitivity of 10 mg. each division of the projection scale, with a direct reading scale range covering 0-5 g.

Permutit Deminrolit Plants

The Mark 4 and Mark 5 portable Deminrolit plants manufactured by **The Permutit Co. Ltd.**, Permutit House, London W.4, have been designed for the easy production, in the laboratory, of distilled quality water from ordinary tap water without the use of heat or power. Being easily portable, these plants have the advantage of making supplies of distilled quality water available 'on the spot.' The Mark 4 is the larger, has a two-wheeled undercarriage and produces demineralised water at a flow rate of about 11 gall. hourly; Mark 5 has a carrying handle and has an output of about 6 g.p.h.

Each plant consists of two columns charged with Zeo-Karb cation exchange material and De-Acidite anion exchange material. Both plants are available as Type E and Type F, the De-Acidite column in the Type E containing a material of medium basicity and that of the Type F a material of high basicity. Type E plants produce a water about equal in quality to commercially distilled water while Type F plants produce water of much higher quality—free from silica and carbon dioxide.

Where demineralised water of exceptional quality is required a third column—in detachable cartridge form—charged with 'Bio-Deminrolit' can be supplied: preferably for use with Type F plants.

Permutit Mk 4 portable Deminrolit plant

Isotope Manipulators

Two new units for laboratories handling radioactive isotopes have been developed by **Nuclear Research Applications Ltd.**, Emefco House, Bell Street, Reigate. The Emefco type T4 tool with remote controlled rotating head and ratchet type holdfast device was originally made in lengths up to 6 ft. only, but is now available in standard lengths of 8 ft., 10 ft. and 14 ft. The head of the model rotates 370° and the claws can pick up a needle as well as a beaker or isotope capsule.

Type 6R was devised to operate through a lead wall. A new shaft was designed to accurate dimensions with stops at both ends. The head of the tool, offset at 45°, is larger than the diameter of the shaft. The tool is introduced into a screened chamber by a special universal ball unit. The split sphere is machined so that concentric ridges in it form an effective joint and barrier against radiation. The sphere is accommodated in a cavity of a 2 in. thick lead brick with the usual 34° interlocking Vee edges. The tool can be locked in any position and at any angle, while a greater universality is achieved because of (a) the 370° rotating head, (b) the 45° offset angle of the tool, and (c) because the complete tool with sphere and locking plate can be removed and used elsewhere.

New Glassware Assemblies

A new method of packaging for laboratory glassware, recently introduced by **Quickfit and Quartz Ltd.**, Stone, Staffs, comprises fitted plastics trays moulded to take all parts in each assemblage in the minimum possible space. The trays, of a sandwich construction so that the glassware is totally enclosed, have been designed to fit into the standard laboratory bench drawer or cupboard. The trays make it easy to spot any broken or missing components and since each has its reference number moulded into the tray, replacement is made easy.

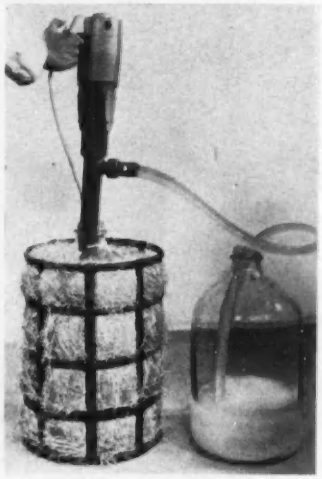
The company's range of assemblages comprises a progressive series of Quickfit interchangeable sets, from gramme to kilogram size. While each set is complete in itself, it can be enlarged by obtaining the appropriate extension set to convert the original into a larger set.

Phillips Measuring Apparatus

Leaflets are available from **Research and Control Instruments Ltd.**, 207 King's Cross Road, London W.C.1, on Phillips equipment introduced in the past year. These include: humidity cell, type PR6000 H; automatic conductivity measurement apparatus; console operator's desk for multi-point temperature measurement; an electronic X-Y recorder, type PR2220 A/00; electronic pH recorder, type PR2210 E; electro-pneumatic controller, type 110.283/03; for control of temperature, flow rate, pH, humidity, level, conductivity, etc.; electronic conductivity control unit, PR9601; conductivity measuring bridge, PR9500; pH meter for industrial use, PR9402; direct-reading pH meter with battery supply, PR9401; direct reading pH meter, PR9400; multi-channel dewpoint supervisory equipment.

Scrubbing, Washing and Neutralising Unit

Available from **Plastic Constructions Ltd.**, Tyseley Industrial Estate, Seelesy Road, Greet, Birmingham 11, is a scrubbing, washing and neutralising unit made from Cobex p.v.c. It is used to neutralise corrosive fumes from plating shops and laboratories before discharge to atmosphere. Operated in conjunction with p.v.c. fans and p.v.c. ducting, it handles 5,000 c.f.m. The neutralising solution, ammonia, is stored in a container and is mixed with the water sprays to form a neutralising spray through which the fumes have to pass.



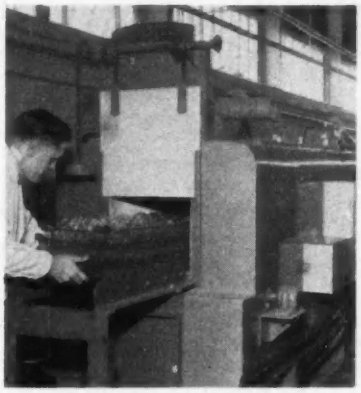
Chemix carboy pump

The Chemix portable pump unit constructed in p.v.c., with a maximum capacity of 600 g.p.h. and a maximum lift of 15 ft., is also available.

Lehr for Annealing Laboratory Glassware

A new continuous glass annealing lehr, manufactured by **Royce Electric Furnaces Ltd.**, Walton-on-Thames, and installed in the Staffordshire works of Quickfit and Quartz Ltd., is used for the annealing of high grade borosillicate laboratory glassware.

The glassware is annealed in wire mesh baskets carried through the furnace on a mesh belt conveyor. Length of the furnace is divided into preheat, heating and cooling sections designed to give the required heating curve. The conveyor is supported on heat resisting alloy castings and on its return passes through the hearth under the heating chamber where it is preheated before entering the furnace. The heating elements are of nickel chrome and are arranged to give uniform heating at temperatures up to 650°C. They are positioned in both



Glass annealing lehr

the preheat and heating chambers, each chamber having its own independent control.

Saunders Tee Valve

Latest addition to the large range of small ¼ in. valves made by the **Saunders Valve Co. Ltd.,** Cwmbran, Mon, is of ¼ in. bore, having a Tee type body in diecast silicon aluminium, with bonnet and handwheel of similar material. A Saunders 'C' grade diaphragm is fitted. The valve provides unimpeded flow along the main line at all times, allowing fluid to pass down the branch line only when the valve is open. By avoiding the Tee piece, nipple and pipe saddle, the valve allows a neat control position to be installed where space is limited.

Electric Furnaces

Electric furnaces for laboratory and workshop use by **A.E.W. Ltd.,** High Street, Edgware, Middlesex, have improvements in construction aimed at giving high efficiency, quick heating and longer life. The drop-down door, which forms a loading platform when open, is heat sealed and the chamber has high-grade insulation on all sides. The elements are carried on interlocking refractory bars and have free expansion and contraction without mechanical strain.

Shandon's New Universal Gas Chromatograph

Among the most important recent developments of the **Shandon Scientific Co., Ltd.,** 6 Cromwell Place, London S.W.7, is the Shandon universal gas chromatograph. This equipment with a novel modular design is claimed to be the most versatile apparatus of its kind. It incorporates an analyser unit in which flame, flame ionisation and argon are readily interchangeable. A special simplified type B analyser unit is available to house the argon detector only. Both analyser units will readily accept a 50 ft. column, which enables full advantages to be taken of the efficiencies, up to 30,000 theoretical plates, that such columns give. A capillary tube may also be fitted.

A high-pressure sample injection system is available for use with 50 ft. columns, and there is a special injector for gas samples. The standard amplifier for the flame detector and a special high-efficiency amplifier for use with the argon and flame ionisation detectors both fit into a separate cabinet, with the recorder and the heater control panel for the vapour bath of the analyser unit.

The modular design is an attempt to protect purchasers against losses arising from the speed with which new techniques and equipment are introduced in this field. Purchasers of the original Shandon flame chromatograph, for example, can bring this equipment up to date simply by adding new detector(s) and amplifier. So far as can be seen, future developments will be just as easily incorporated.

Another recent Shandon introduction is a versatile new mixer/agitator, the Vibromix. This is made in four models —one for laboratory use and three larger types for industrial use. There are no rotating parts; the standard stirring element is a disc, pierced with tapered holes, which vibrates up and down at mains frequency, 6,000 times a minute. It achieves complete interfacial mixing and creates no vortex or stratification. Lumps are rapidly broken up. The amplitude of the vibrations is fully controllable from zero to maximum.

The Agimag, another new product, is basically a high-efficiency magnetic stirrer employing a brushless 240 V a.c. motor. The Universal model RU10, can be used as a normal stirrer with stirring spindles for amounts up to 6½ pints. Speed is variable from 50 to 2,000 r.p.m. Stirring rods for Agimag models are available in lengths from 10 mm. to 70 mm. in glass, polyamide or Teflon.

The new Circotherm II constant temperature bath apparatus is a re-designed version of an earlier model, with new features. The equipment consists of a brushless stirrer motor, 700 V heater element, circulating pump, control thermometer and contact thermometer operating a built-in transistorised relay. It may be used with containers of any shape, size or construction, and will hold the temperature of the bath within close limits—in suitably-insulated vessels to ±0.1°C. The centrifugal pump, mounted on a common shaft with the stirrer, will circulate up to 7 litres per minute and has a maximum discharge head of 13 ft.

Laboratory Vacuum Pump

Stanfield and Carver Ltd., 13 Carrington Street, Nottingham, have introduced a special combined laboratory vacuum pump, developed by Korting, Hanover, for Badische Anilin and Sodafabrik. There are no moving parts and maintenance is said to be unnecessary.

The pump consists of a steam jet air ejector, a small interconnected surface condenser and a water jet air ejector. It is fitted complete with connections, valves, gauges and cocks and is housed in a grey hammered casing. All parts in contact with gases and air are made from V2A or V4A Krupps stainless steel or similar material. The apparatus has a mean exhaustion rate of 0.33 lb. per hour of air from a vacuum of 2 to 5 mm. Hg. absolute. Steam consumption is between 9 and 11 lb. per hour, with an operating steam pressure of 7.5 to 15 p.s.i.g. Essential feature of the pump is the low water consumption of 330 Imp. gal. per hour with a motive pressure of 45 p.s.i.

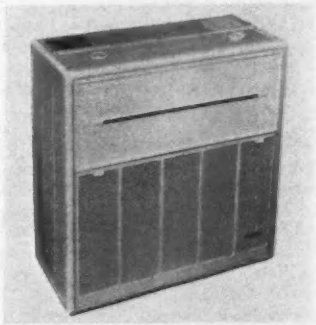
Laboratory Filters

Laboratory filters in the range made by **Stream-Line Filters Ltd.,** Ingate Place, London S.W.8, include an 'enclosed-pack' type suitable for use when it is necessary to force the liquid through the filter under pressure. Spring-loading of the pack is adopted to ensure that results are comparable with those from larger commercial types. The filter pack is enclosed in a toughened glass cylinder, suitable for working pressures up to 40 lb./in.². This model can be used as a vacuum filter when suction is then applied to the filtrate line instead of pressure to the pre-filt line.

Air Conditioning Cabinets

The air conditioning cabinets produced by **Thermocontrol Installations Co. Ltd.,** 2-10 Valentine Place, Blackfriars Road, London S.E.1, are packaged units incorporating a fully automatic control system. All the standard models incorporate both cooling and heating, humidifying and de-humidifying, so that the normal functions of a full air conditioning plant can be performed.

There are two basic types, the first of which, known as the Airmonitor, comes in two sizes, having one and two tons refrigeration capacity. These units



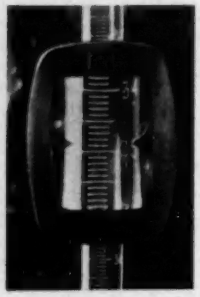
Airmonitor by Thermocontrol

are completely self-contained in attractive cabinets. They are intended to handle rooms up to about 4,000 cu. ft. volume.

The second type, the Climatrol, is a split unit, with the refrigeration compressor and condenser unit mounted separately from the air conditioning cabinet. The latter can be located inside or just outside the conditioned space, while the compressor and condenser unit are mounted wherever convenient, and pipes carry the refrigeration to the direct expansion coil in the cabinet.

Major Thermostat Bath

The latest Major thermostat bath, X.27, manufactured by **Townson and Mercer Ltd.,** Beddington Lane, Croydon, is intended to give an accuracy at 100°C



Townson thermometer and burette reader has a plastics lens mounted in rubber with wire clips that grip well on almost any size tube

well within any possible requirement in the near future (±0.010°C or better). A development of the standard X.27 bath, the new model incorporates an increased depth to take the new type of specialised viscometers. The rate of stirring has been greatly increased and the method has been changed to give greater velocity and mixing over the heaters, while retaining straight line flow. Automatic boost control is now included as standard and the micrometer adjustment of the regulator can be made by a coin slot, from the outside of the bath.

Interchangeable Stopcock Keys

G. Springham and Co., Harlow New Town, Essex, who specialise in the manufacture of stopcocks, have carried out research designed to produce a satisfactory stopcock that gives a leakage rate within the B.S. specification. They have now introduced a range of products under the trade name of Interkey which conform to the specification leakage rate with complete interchangeability. This has been made possible by introducing new grinding techniques that give much closer limits and eliminate all high spots on the taper of both key and barrel, ensuring perfect tapers.

Fume Cupboard

A small fume cupboard made by **Tanks and Linings Ltd.,** Town Wharf, Droitwich, Worcs, has a transparent Perspex front, but is otherwise made from expanded metal reinforced p.v.c. This new material gives a stiffer and stronger sheet and the ability to withstand higher temperatures than unreinforced p.v.c.

Fume cupboard of expanded metal reinforced p.v.c. with Perspex front, by Tanks and Linings

Although both clear and opaque sheets are available, the clear material is most popular. The use of plastics throughout removes danger of corrosion and the clear material permits the use of external lighting to illuminate the interior.

New Towers Stirrer

The Multispeed stirrer is a powerful unit with alternative separate control units giving a wide range of speed settings, state **J. W. Towers and Co. Ltd.,** Widnes, Lancs. A gear box is an optional extra. The final version will have a range of accessories to make the unit as versatile as possible. The separate control unit makes the stirrer ideal for fume cupboard applications. The Mk. I model has 10 speed settings, while the Mk. II model has 100 settings. Finish of both is grey stove enamel.

Towers Multispeed stirrer

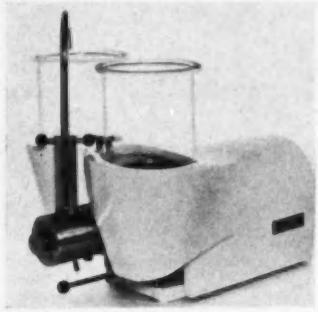
The newly introduced Towers simmerstat unit is designed for flush mounting on bench, wall or control panel, and is also suitable for normal bench use. It gives current control from zero to maximum by opening and closing a snap action switch at short definite intervals.

Ultrasonic Homogeniser

The newly developed Minisonic model 3, introduced by **Ultrasonics Ltd.,** Otley, Yorks, is three machines in one: (1) A laboratory homogeniser with which small quantities of emulsions and dispersions can quickly be made. Up to 31 can be treated at one filling without external premixing; (2) A small batch homogeniser for small batches of emulsions; (3) A pilot plant homogeniser with which an emulsification process can be worked out on a small scale and immediately transferred to production using a Rapisonic homogeniser.

The principle upon which Model 3 works is that of the liquid whistle, a thin blade being made to vibrate in a liquid stream. These vibrations, with a frequency of 18-22 Kcs, are inaudible to the human ear and of such a high level of energy as to induce cavitation. Intimate mixing is thus brought about and it results in truly homogenous emulsions of very fine particle size.

During development work, no limitations with regard to hot liquids were met and a novel feature enables a wide range of viscosities to be processed with equal efficiency.



Model 3 laboratory homogeniser

Recording Spectrophotometer

The Unicam SP.700 recording spectrophotometer (**Unicam Instruments Ltd.,** Arbury Works, Cambridge), automatically records transmittance or absorbence on a linear wave number scale in the range from 54,000 cm^{-1} (186mμ) in the u.v. to 2,800 cm^{-1} (3.6μ) in the near i.r. The lower part of the range is covered by a fused silica prism, characteristics of which enable the instrument to be used down to the limit imposed by atmospheric absorption. The prism begins to absorb at 4,000 cm^{-1} (2.5μ) in the near infra-red, and here the dispersing element is changed by simple lever control to a diffraction grating (7,500 lines per in.), which covers the important hydrogen stretching region from 4,000 cm^{-1} to 2,800 cm^{-1} (3.6μ) in the first order. Unwanted orders are removed by a germanium filter.

Unicam 700 recording spectrophotometer

The detectors used are a 13-stage photomultiplier and a lead sulphide photoconductive cell, changeover from one to the other being made at 13,000 cm^{-1}. The spectrum is plotted on a strip chart recorder; wave number is indicated both by a counter on the front panel, and by marks made on the edge of the chart at equal wave number intervals.

Overseas News

U.S. COMPANIES' PLANS TO PRODUCE SYNTHETIC RUBBER IN AUSTRALIA

AFFILIATES of Standard-Vacuum Oil Co. and Goodyear Tyre and Rubber Co., it is stated, will produce synthetic rubber in Australia in 1961. Goodyear Tyre and Rubber Co. (Australia) Ltd., have acquired a substantial interest in Australian Synthetic Rubber Co. Ltd. formed recently by Vacuum Oil Co. Pty. Ltd.

An $11 million plant will be constructed near Melbourne; it will be a unit of the $50 million four-plant petrochemical complex announced by the Stanvac organisation last January. The contract for the basic petrochemicals plant, which will produce the raw materials for the rubber, has already been awarded to Fluor International S.A. and the Utah Australia Ltd. Engineering is under way for the rubber plant, for a polythene plant to be built and owned by Union Carbide Australia, Ltd., and for a styrene plant to be owned and operated by a company jointly owned by C.S.R. Chemicals Ltd. and Dow International. The four plants are expected to be in full operation by mid-1961.

Saint Gobain's Output Up 15%

Output of Saint Gobain S.A.'s chemical plants increased by 15% during 1958 compared to an increase of 14% for the French chemical industry as a whole. The most marked increase was in the production of organic chemicals.

New installations put into use during the year included a plant for sulphuric acid manufacture at Saint-Fous, with a capacity of 300 tons per day, and a plant for the manufacture of sulphate of alumina. Production capacity for many organic chemicals was increased during the year and new plants were built for the manufacture of maleic acid and anhydride, phthalic anhydride and polyester resins. The chemical plutonium extraction plant in Marcoule was completed. Other work in this field includes the construction of a uranium refining plant as well as a number of projects for erection of new facilities in France and abroad.

Turnover at Frs.110,845 m. represented an increase of almost 22,000 m. over the previous year. Net profits amounted to Frs.2,393 m.

West German Complaints of Cheap Plastics Imports

According to the West German Association of Chemical Industry, imported plastics are being offered in Germany at near cost price or even below. Reporting on plastics for the first four months of 1959, the association says cheap imports were coming mainly from Japan. During the period under review Japanese plastics worth £170,000 were imported, whereas a year ago they were almost negligible.

Imports from the U.K. were given as £320,000 as against exports to the U.K. of £1.5 m. Total foreign trade in plastics also showed a comfortable surplus for Germany, with exports at £17.7 m. against imports of £5-6 m. (both figures a quarter up on 1958).

Fisons' South African Plant on Stream

The Fisons fertiliser factory at Sasolburg was opened recently by the South African Minister of Economic Affairs. Annual capacity of the plant, built at a cost of £2.5 million, is 75,000 tons of sulphuric acid, 200,000 tons of superphosphates and 11,200 tons of granular mixtures.

The Minister said that South African consumption of fertilisers rose from 365,000 tons in 1937 to 1.1 million tons in 1958. Nitrogen from Sasol's oxygen plant amounted to 1.5 million tons a year, but had not yet been harnessed for fertiliser use. Conversion of the Sasol nitrogen would be an expensive undertaking. Total African consumption was still only 240,000 tons a year of that type of fertiliser.

The £10 million plant of African Explosives and Chemical Industries Ltd. at Modderfontein, that will produce 110,000 tons a year of urea, will make the Union independent of imported nitrogen when it starts operating next June. £6 million of the £10 million is being spent in South Africa and £4 million overseas. The new plant is being built by Werkspoor N.V., Holland.

Jap Firm will be World's Third to Make Polycarbonates

The third free world company to take up the production of polycarbonate plastics is the Japanese firm, Kunoshima Chemical Co. The only other producers of polycarbonates are Farbenfabriken Bayer AG, Leverkusen, West Germany, and the General Electric Co., U.S.

Italian and Monsanto Interests in Turkish Chemical Plant

A sum of $6,100,000 has been advanced by the Development Loan Fund, of the U.S. towards the building in Istanbul of a plant for the production of p.v.c., caustic soda and other chemicals. The plant, to be run by the Sirketi company of Vinylex Ltd., will be owned jointly by the Italian concerns, Sicedison and Oranzio de Nora, and by the Monsanto group.

Bunawerke Plan Carbon-black Based Synthetic Rubber

Plans are in hand for the large-scale production of carbon-black based synthetic rubber by Bunawerke Hüls G.m.b.H. Such a rubber would be based on the Buna material now being produced at the company's Marl plant. Some 90% of the Bunawerke's initial capacity is now in use, and by next year the initial capacity will have been passed. The new plant necessary for this increase in output will come into operation in the late summer of next year.

Israeli Nylon Plant

Rogosin Industries Ltd., of Israel, are to take up production of nylon and polyester fibres in a new plant which they have built on 1 April next year.

Chinese Polythene Plant

Alcohol from a sugar refinery is being used as base material for a polythene plant now being operated in Canton, it is reported by the Communist Chinese news agency.

New Polythene Film Plant will Raise Visking Capacity 50%

Visking Co., a division of Union Carbide of Canada Ltd., have purchased a site in Cowansville, Que, for a plant devoted to the manufacture of polythene film. A plant of 24,000 sq. ft. is to be constructed and the new facilities will increase Visking's polythene film capacity by 50%. Construction will begin shortly, with completion scheduled for early 1960.

Dutch Chemical Turnover Up £7 million Last Year

Turnover of the Dutch chemical producers amounted to fl.2,525 million (£238.2 million) in 1958, compared with fl.2,450 million (£231.1 million) in 1957. This is stated by the Netherlands Chemical Industry Association in its annual report for 1958. Last year home sales were valued at fl.1,266 million (£119.4 million) against fl.1,233 million in 1957 (£106.3 million); exports were worth fl.1,259 million (£118.8 million), against fl.1,217 million in 1957 (£114.8 million).

Ugine Plan Unit for Synthetic Rubber

Chemical output by Ugine S.A., Paris, remained generally unaffected by prevailing recessionary tendencies, reports M. René Perrin, chairman. Production continued to increase particularly as regards fluorine derivatives, oxygen products, sodium cyanide and chloride.

New projects in hand include the construction of new plants for synthetic rubber as well as a number of other petrochemical products. The company is also active in the atomic energy field.

Turnover reached Frs.64,305 m., representing an increase of 17% over 1957. Net profits amounted to Frs.1,648 m. as against Frs.1,557 m. in the previous year.

1, 2-Butylene Oxide Available

Now available in commercial quantities is the first single-isomer butylene oxide, 1,2-butylene oxide. Producers are Dow Chemical Co., Midland, Michigan, who claim that it is much more reactive than the butylene oxide isomeric mixtures previously offered. Reaction rates

in many cases have been found to be double those obtained with isomeric mixtures. Also the reaction and properties of reaction products can be controlled more closely than previously.

Principal indications are: as an ingredient of stabilisers for chlorinated solvents where it functions as an acid acceptor; in production of polybutylene glycols, for use as oil, gasoline and grease additives, and in preparation of rigid and flexible methane foams; in production of mixed polyglycols, for use, as non-ionic surfactants and processing emulsifiers; in preparation of mono-, di-, and tributanol-amines, etc.; and in production of glycol-ether-type compounds by reaction of alcohols with 1,2-butylene oxide.

Franco-Czech Magnesite Plant Contract

A contract has been signed between the Czech foreign trade company Strojimport and the French Fontainebleau plant manufacturers for the delivery by Fontainebleau of a magnesite processing plant. The plant is valued at $250,000.

Kali-Stauffer Tie-up

Kayli-Chemie AG. Hanover, W. Germany, are to form a joint chemical producing company with Stauffer Chemical Co., New York. The company, which will bear the name of Kali-Chemie-Stauffer G.m.b.H., will be registered in West Germany. It will produce insoluble sulphur by a process developed by the U.S. company.

Du Pont Polythene Plant

Plans to build a major plant to produce polythene resin at their Victoria (Texas) works have been revealed by E. I. du Pont de Nemours and Co.

C.I.L. to Build Plant for Pentaerythritol Tetranitrate

Canadian Industries Ltd. are to build a plant for the manufacture of pentaerythritol tetranitrate (PETN) at their Beloeil Works, Quebec; it will be the first of its kind in Canada. Construction of the $500,000 plant is expected to begin in September of this year and to be completed by March 1960. Most of the output will be used in the manufacture of blasting accessories.

Joint Dutch-Mexican Nylon Plant for Monterrey

A nylon plant is being set up at Monterrey, Mexico, as a joint venture by A.K.U., of the Netherlands, and Cellulosa y Derivados of Mexico. Nylon 6 and 6.6, textile yarn and nylon tyre yarn will be produced. Production is to begin as soon as possible. A.K.U. and their U.S. associate, American Enka, will provide technical aid and know-how.

Petrochemicals from Esso AG

West German petrochemical and mineral oils producer, Esso AG, of Hamburg, are to spend some £4½ million on the extension of petrochemical plant at their newly-opened Cologne refinery and oil by-products plant. A second steam cracker will be added to the existing unit with respective plant for further processing to double the present petrochemical capacity of the Cologne plant. This further plant will be brought on stream in mid-1961.

Soc. Celene to Double Capacity of New Polythene Unit

The new plant which Soc. Celene are building at Priolo, near Syracuse, Sicily, for the production of polythene, ethylene oxide and glycol, ethanolamine and derivatives and which is due to go on stream before the end of 1959, is to be expanded. Instead of producing 12,000 tons a year of polythene, a capacity of 25,000 is planned. The plant has been designed and engineered so that capacity can be raised to 35,000 tons a year if necessary.

Montecatini's Patents in U.S.S.R.

Representatives of Montecatini and officials of Techmashimport have signed an agreement in Moscow under which the Russian chemical industry will be able to use Montecatini's patents covering production of maleic anhydride, titanium dioxide, acetylene, and ethylene.

Sasol Return Surplus on Oil-from-coal Operations

According to Dr. F. J. du Toit, chairman of Sasol and deputy chairman of Iscor (the Iron and Steel Corporation), both companies are producing large quantities of chemical raw materials which will be the start of a vast new chemical industry in South Africa. He added that Iscor's £56 million expansion programme is in full swing; value of Iscor products this year was about £60 million, a fair percentage of which came from chemical by-products.

During the last financial year, Sasol returned a cash surplus from its oil-from-coal operations.

Sun Oil to Make Propylene

Construction is to begin of a $2 m. unit at Sun Oil Co.'s Marcus Hook, Pa, refinery to make propylene. Scheduled to be on stream by the end of 1959, it will have a capacity of 120 m. lb./year. Part of the propylene produced will be used for propylene production by Avisun (C.A. 16 May, p. 830), Sun Oil's joint venture with American Viscose.

Bubble Caps in New Thermosetting Resin

New products exhibited by Wyatt's Plastics, Houston, Texas, U.S., at the recent World Petroleum Congress in New York were thermosetting plastics, bubble caps and resins. The new thermosetting resin, Wyatt 1099 is claimed to meet most corrosion requirements in refining and chemical processing industries.

Tests have been carried out in a large refinery. After contact in a tower for one year with 55 to 65% sulphuric acid at 340°F. the parts in the new thermosetting plastics material showed no corrosion or other untoward effects.

It is considered that bubble caps and risers made from Wyatt 1099 will cost less than other normally used materials since they can be moulded. Tensile strength at about 5,000 p.s.i. is greater than that of pressed carbon, hence openings in the risers can be made larger without weakening them, so allowing greater throughputs and greater economy.

Du Pont's Delrin Believed to have Strength of Metals

DUE on stream shortly is E. I. du Pont de Nemours Co.'s 12 m. lb. capacity plant at Parkersburg, W. Va, for manufacturing Delrin resin. Expansion to 25 m. lb. or more capacity is planned. Cost of development is estimated at $27 m.

Delrin, an acetal resin and chemically polyoxymethylene or polyformaldehyde, is expected to find 75% of its potential use in replacing brass, aluminium and zinc. About 10% will be used to replace plastics and the balance will be used instead of hard rubber, wood and glass. In fact Du Pont expect Delrin consumption by the car industry to average 2 lb. per car (estimated as a total 2 m. lb. market). The resin will be sold in two grades—500 for general purpose moulding, and 150 for extrusion, and will be available in 14 basic colours plus 42 service colours. Conventional processing equipment can be used but there is a critical moulding temperature. In a moulding machine at 400°F., the resin will start to decompose in 50 minutes; at 480°F. decomposition starts in eight minutes.

Manufacturing details on Delrin have not been indicated by Du Pont. Some 40 patents covering this plastics material have been issued, which show that the process involves production of very pure formaldehyde (99%) from either paraformaldehyde or the hemi-formal of cyclohexanol. Solvent polymerisation with an ionic catalyst is involved, use of a variety of hydrocarbon solvents being possible (e.g. hexane or pentane). Ionic catalysts include phosgene, arsine, quaternary salts and Grignard reagents. Atmospheric pressure is used and a temperature of between 0° and ambient. Polymerisation is stated to be rapid with the polymer precipitating in the solvent. To prevent hydrolytic attack and disintegration of the polymer, the ends of the polymer are capped by making either an ether with methanol and an acid, or an ester with acetic anhydride. Delrin is a linear polymer, each chain containing more than 1,000 formaldehyde units.

Investment of $27 m. in Delrin is more than that invested by Du Pont in developing nylon. The company expect Delrin to equal nylon in its market potential. Also, there are possibilities that using acetaldehyde or propionaldehyde even stronger plastics than Delrin can be produced.

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LA.91

PEOPLE in the news

● **Mr. Hector D. Walker,** sales director of Constructors John Brown Ltd., left London Airport on Wednesday, 19 August, for the Middle East.

● **Mr. R. H. Powell,** technical director with the Griffin and George group of companies, has relinquished his appointments.

● **Sir Owen Wansbrough-Jones, K.B.E., C.B., M.A., Ph.D., F.R.I.C.,** chief scientist to the Ministry of Supply since 1953, who will join the board of Albright and Wilson Ltd. on 1 October, will assume responsibility for the technical development of the company. These duties are now carried out by **Mr. B. Topley, M.A., F.R.I.C.,** who will continue as a full-time director. In addition to his other duties he will act as an adviser on research for the A. & W. group.

Dr. P. J. Garner (left), new director of research at Shell Chemical's Carrington Research Laboratory (C.A., 1 August, p. 85). E. A. Bingen, right, has been elected a deputy chairman of Imperial Chemical Industries Ltd. (C.A., 1 August, p. 81)

● **Mr. R. Groves, M.A., B.Sc.(Oxon), F.R.I.C.,** Master of Dulwich College since 1954, has accepted an invitation to serve as chairman of the Food Standards Committee of the Ministry of Agriculture, Fisheries and Food for a period of three years. He succeeds **Dr. Norman Wright, C.B.,** who resigned to take up an appointment in Rome as deputy director-general of the Food and Agriculture Organisation of United Nations.

● **Dr. D. A. Sutton, Ph.D., B.Sc., A.R.C.S.,** chief biochemist of the South African Council for Scientific and Industrial Research Pneumoconiosis Research Unit, Johannesburg, has been appointed director of research of the British Gelatine and Glue Research Association. Aged 41, Dr. Sutton, who is expected to take up his appointment towards the end of October, succeeds **Mr. A. G. Ward, O.B.E.,** who is leaving this month to become Professor of Leather Industries at Leeds University. Before going to South Africa in 1949, Dr. Sutton held posts with the British Rubber Producers' Research Association and the Paint Research Station. Until 1956 he was head of the C.S.I.R. Division of Organic Chemistry.

● **Sir Miles Thomas,** chairman of Monsanto Chemicals Ltd., will open the second symposium of the Incorporated Advertising Managers' Association at the Connaught Rooms, London, on 30 September. Sir Miles is a past president of the Advertising Association.

● **Mr. D. J. Wardlaw** has been appointed assistant sales manager of the Process Control Division of Elliott Brothers (London) Ltd., with special responsibility for sales to the rubber, plastics and textile industries.

● **Mr. P. C. Chaumeton,** managing director of Styrene Products Ltd. (an associate of Shell Chemical Co. Ltd.) has retired. At a luncheon given in his honour, **Mr. L. H. Williams,** managing director of Shell Chemical, and chairman of Styrene Products, spoke of Mr. Chaumeton's invaluable work with the company. Mr. Chaumeton has been connected with the development of the plastics industry since its early days,

P. C. Chaumeton, who has retired as managing director of Styrene Products Ltd.

having served with several firms, including Lansil Ltd. In 1944 he joined the board of Erinoid Ltd. and had been managing director of Styrene Products since 1950. From 1952 to 1955 he was a director of Petrochemicals Ltd. Mr. Chaumeton will continue to be actively associated with Erinoid as deputy chairman.

● **Dr. A. G. J. Buckle, M.Sc., Ph.D., A.R.I.C.,** has been appointed technical director of Technicon Instruments Co. Ltd., 26 Warwick Road, London S.W.5. Prior to this he was chief chemist of the Helsby Division of British Insulated Callender's Cables Ltd. Dr. Buckle is now in New York and on his return will establish a full laboratory service in London for Technicon Instruments. After this he will hold a series of training courses for users of the Technicon Auto-Analyzer. He will also assist users in development work for automatic analysis. Basic Technicon research will, however, continue to be carried out in the U.S.

● **Dr. Peter Ramwell,** of the Department of Pharmacy, Bradford Institute of Technology, the first holder of a Griffin and George travel fellowship, has visited hospitals in Paris, Frankfurt, Brussels and Berlin and will shortly visit Basle. Institution of the fellowships followed the formation of Griffin and George (Research and Development) Ltd.

● Nash and Thompson Ltd., Chessington, Surrey, have reorganised their Sales Division. **Mr. J. L. Foreman,** who has been appointed sales manager, was previously a commercial manager in the Elliott-Automation Group. Mr. Foreman is responsible for home and export sales policy, publicity and market research. **Mr. D. E. Mortis** has been promoted sales office manager with special responsibility for process control, oil, gas, mining, medical and survey equipment. **Mr. R. C. Blezard** is the sales engineer responsible for all metallurgical sales and **Mr. T. N. Mordue** covers counties south of the Thames for the Nashton range of miniature electronic test equipment. Sale of scintillators is now covered by **Mr. D. A. Ginger,** chief chemist, and environmental testing by **Mr. G. F. Thompson,** head of the component testing laboratory.

● **Professor Donald Burton, M.B.E.,** who retires from the Chair of Leather Industries, Leeds University, at the end of August, is to be guest of honour at the annual dinner of the Society of Leather Trades Chemists on 25 September, when he will be made an hon. member in recognition of his services over the past 42 years.

● The newly-created rank of Professor Emeritus at the Weizmann Institute of Science, Rehovot, Israel, was recently conferred upon **Dr. Anna Weizmann,** who joined her brother—the late Dr. Chaim Weizmann—in his chemistry research at the Daniel Sieff Institute, Rehovot, 25 years ago. The award was made in recognition of valuable contributions to organic chemistry and loyal service to the Daniel Sieff Research Institute and the Weizmann Institute. Dr. Weizmann has been engaged in the synthesis of pharmaceuticals and in the identification and isolation of natural products from local plants.

● **Dr. N. B. Dyson** has been appointed to the newly created position of manager, production planning and control, for Monsanto Chemicals Ltd. Since 1953 he has been works manager and, later, general works manager at the company's factory at Newport, Monmouthshire. He has been with Monsanto for 25 years. **Mr. G. V. Taylor** has been appointed works manager at Newport in place of Dr. Dyson. **Mr.**

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K. H. Handy, works manager at the new Monsanto factory at Fawley, near Southampton, for the last two years, has been appointed works manager at the Ruabon, Denbighshire, factory, and **Dr. E. W. Bodycote,** acting works manager at Ruabon, has been appointed works manager at Fawley.

Chester H. Goodwin, left, general project manager of Chemstrand's Acrilan plant has returned to the U.S. (C.A., 15 August, p. 131). A. J. Prince, right, development director of I.C.I. Heavy Organic Chemicals Division, is now carrying out industrial consultancy in France (C.A., 15 August, p. 131)

● **Mr. L. J. Evans,** managing director, Technicon Instruments Co. Ltd., will be visiting Australia, New Zealand, Hong Kong and India, starting from the end of August. His company has received a number of inquiries from these countries for industrial and clinical application of the Technicon Auto-Analyzer for continuous and intermittent monitoring.

● **Mr. B. R. May,** engineering manager of I.C.I. Fibres Division has been appointed engineering director of the division with effect from 1 September. He succeeds **Mr. H. West** who retires on 31 August.

● **Mr. S. Kirkpatrick,** who has been granted the Memorial Award of the Chemical Market Research Association of the U.S., will present a paper next month on 'Market research gives a new dimension to management.' Mr. Kirkpatrick is editorial director of two of our U.S. contemporary journals *Chemical Week* and *Chemical Engineering.*

● **Lord Baillieu, K.B.E., C.M.G.,** president of the Dunlop Rubber Co., Ltd., has accepted the nomination of the council of the British Institute of Management for election as its first president at the annual meeting in October. It was in 1946 that Lord Baillieu (then Sir Clive) acted as chairman of the committee set up by the President of the Board of Trade to formulate detailed proposals for setting up a central institute for all questions connected with management.

● **Professor J. Heyrovsky** has been awarded the Polarographic Society Medal, a new silver medal, for his discovery of the polarographic method in the 1920's and for the subsequent major contributions to the subject by himself and his students. The medal will be presented by **Professor W. H. Linnell,** vice-president, Polarographic Society, at the opening of the International Congress of Polarography at Cambridge on 24 August.

● **Professor R. B. Woodward, B.S., Ph.D.,** Morris Loeb Professor of Chemistry at Harvard University has been appointed Morrell lecturer at Cambridge University for 1959-60. Other Cambridge appointments include **Dr. T. E. Faber, M.A., Ph.D.,** Corpus Christi College, as demonstrator in the Department of Physical Chemistry for three years from 1 October and **Mrs. A. A. Newton, M.A., Ph.D.,** Newnham College, as demonstrator in the Department of Biochemistry for three years from 1 October.

● Electric Resistance Furnace Co. Ltd., Weybridge, have established a new post, service manager, appointing to it **Mr. H. J. Tucker,** southern area sales manager for the past 10 years. **Mr. C. A. McNeill, C.G.I.A., M.A.I.E.E,** has joined the company's technical sales staff at their Midlands area office, and **Mr. M. J. Parsons,** who has worked for many years with Edwards High Vacuum Ltd., has joined the sales organisation at Weybridge.

● **Mr. D. E. Weiss,** principal research officer of the chemical research laboratories, C.S.I.R.O., Melbourne, is in England on a two-month visit to study dyestuff chemistry at the Manchester College of Science and Technology. He will return to Australia in September after attending the London conference of the International Federation of Associations of Textile Chemists and Colourists.

● **Mr. L. C. Montague** and **Mr. F. O. Newton** have been appointed members of the board of administration of Universal-Matthey Products (Deutschland) G.m.b.H. (see p. 188), and **Mr. A. E. Richards** has been appointed manager.

Obituary

Mr. Charles Cooper, 68, who died recently, spent five years as chief chemist to the West Cumberland By-Product Co., Flimby, nr. Maryport, before joining W. C. Holmes and Co. Ltd., Huddersfield in 1918. On his retirement in 1956, he was managing director and head of the Gas and Chemical Division of W. C. Holmes and Co. He was retained by the company as consultant. His name was associated with the introduction of gas drying using calcium chloride solution and with problems on condensation and washing of coal gas and the recovery and purification of benzole.

The death has occurred of **Dr. Donald Chisholm,** who was a lecturer in the Department of Chemistry, Glasgow University, for 36 years. He was 64.

Wills

Sir John Gibb Nicholson, an original director, and later deputy chairman, of Imperial Chemical Industries Ltd., who died on 13 June, aged 79 years, left £42,380 net. (Duty paid £11,882.)

Mr. John Mackerill, O.B.E., M.Sc., former manager of I.C.I., Runcorn, left £14,516 15s 7d net.

New Compound to Control Lettuce Disease

BOOTS Pure Drug Co. Ltd. are marketing Allisan, a product for the control of *botrytis cinerea*—grey mould—in lettuce grown under glass.

Allisan contains a nitrated chloroaniline derivative. It will be sold in the form of a yellow powder which is mixed with the soil before planting or used afterwards as a dust. It has no smell or taste and has been passed by the Ministry of Agriculture as harmless.

Allisan has also been found effective against tulip fire and stem botrytis in tomatoes.

It is the result of 15 years' research, in which 8,000 compounds were tested.

A big advantage claimed for Allisan over substances often used for the control of botrytis is that it does not check growth.

Courses in Polarography

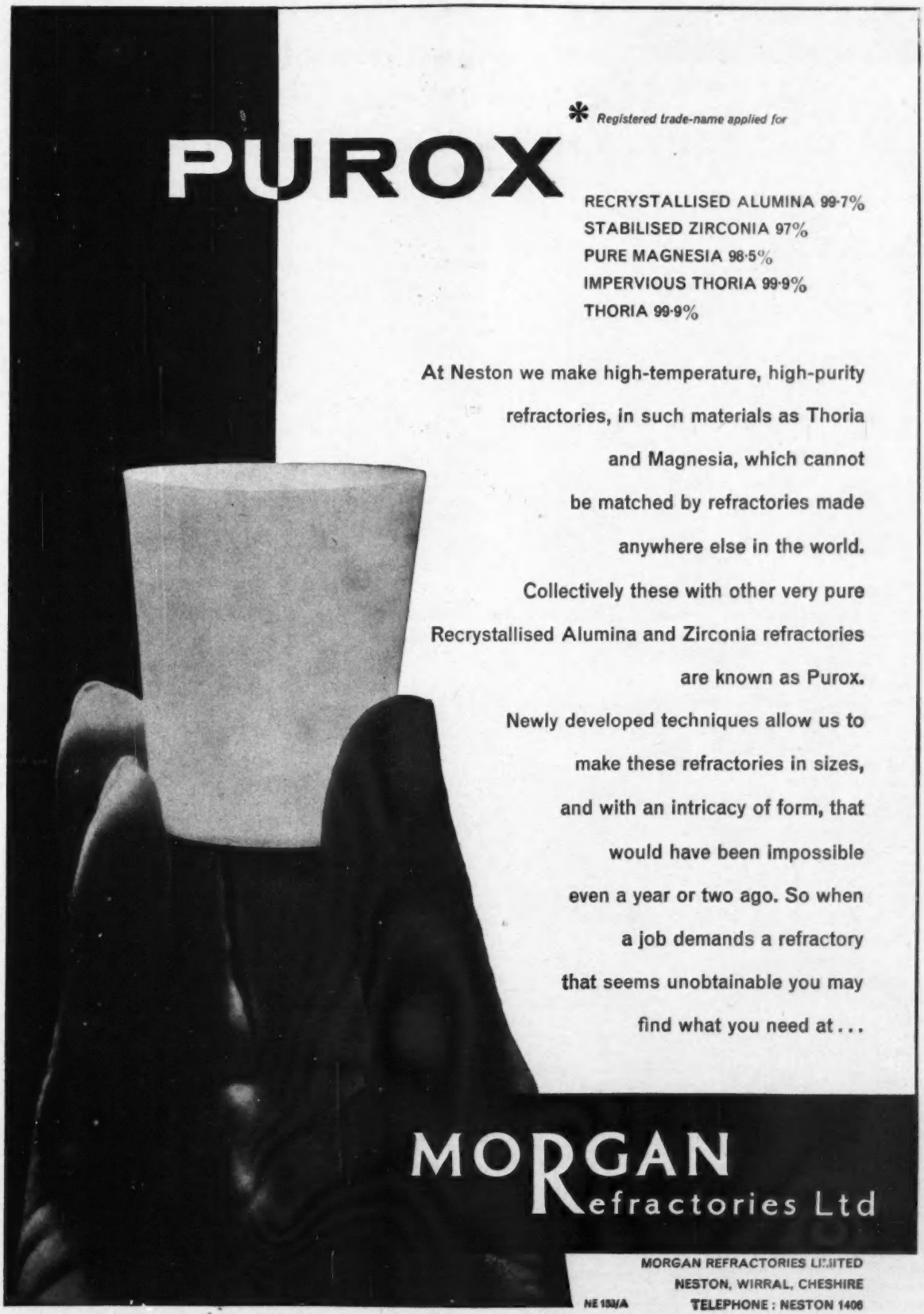
Five-day practical training courses are being held by the British Polarographic Research Institute, 55 Oriental Road, Woking, Surrey, the first being from 31 August to 4 September. Extension courses are also being held and courses in advanced or special techniques will be arranged to meet the requirements of applicants.

Kestner Supply Acid Pickling Plant

THE Clyde Alloy Steel Co. Ltd., a subsidiary of Colvilles Ltd., has placed a contract with the Kestner Evaporator and Engineering Co. Ltd., London, for an acid pickling plant to treat 620 tons of steel billets and castings per week. The contract will also include a Kestner/Fakler acid recovery unit, a continuous neutraliser and fume extraction plant.

This pickling plant will comprise two tanks 17 ft. 6 in. by 8 ft. by 5 ft. deep, one of which will contain sulphuric pickle acid, and the other wash water. Heating of the pickle acid will be by means of circulation through a Kestner acid heater. This circulation system will also cause continuous movement of the pickle acid along the pickle tank. Fume extraction is being provided on the pickle tank by means of lip ducts from which the fume is extracted by a 36-in. fan and exhausted by a chimney above the roof of the pickle shop building. The pickle acid will be processed in a Kestner/Fakler acid recovery plant to remove the build-up of iron in solution, the reclaimed acid being returned to the pickle tank.

Materials for all the items of this plant which will come into contact with acid and acid fume will be Keebush and Keeglas—manufactured by Kestner.



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Commercial News

- **D.C.L. Trading Profit Rose by Over £2 m.**
- **Higher Greeff Income from B.T.P. Holding**
- **Universal-Matthey Catalysts For C.M. Area**
- **Reichhold's Record Half Year Earnings**

Boots

Boots Pure Drug Co. Ltd. have declared an interim dividend of 3% (same) for the half year ending 30 September 1959.

Distillers Co. Ltd.

Trading profit of the Distillers Group for the year ended 31 March 1959, after depreciation of £2,269,019 (£2,118,503) amounted to £24,829,402, an increase of more than £2 million compared with the previous year. Consolidated profit was £25,947,701 compared with £23,463,856. Taxation took £12,581,361.

Net profit attributable to Distillers Co. is £13,172,095. Of this subsidiaries have retained £3,876,448 and the amount available for appropriation is £9,165,727.

A final dividend of 8½% is declared making a total of 12½% for the year on revised capital. A substantial part of DCL's reserves were capitalised immediately after declaration of the interim dividend, and the rate of 7½% declared on the old capital is equivalent to 4% on the revised capital.

Profits retained by Distillers Co. will be £3,175,545. Outstanding commitments for capital expenditure amount to approximately £712,000 (£814,000) for Distillers Co., and £2,220,000 (£1,890,000) for the group.

Greeff-Chemicals

Greeff-Chemicals Holdings have revalued their trade investments at £1,356,480 at 31 December 1958. This gives a surplus of £480,265 over the previous book value. The trade investments, the largest of which is a holding in British Titan Products, are complementary to and closely allied with the company's own trading. Income therefrom contributed £141,730 (£105,950) of the 1958 group profit, before tax of £218,634 (£186,163); turnover for the year is stated as being only slightly lower than the 1957 record. Results of trading to date are estimated as being comparable with the 1958 period.

Powell Duffryn

With a final dividend of 10%, Powell Duffryn Ltd. pay 16% for the year ended 31 March 1959, the same as for the three previous years. Consolidated trading profits, including investment income, were £1,720,230 (£2,032,709). Depreciation charged before arriving at this figure was £976,356 (£844,181). After taking credit for £324,000 (£221,000) of relief arising from investment allowances on capital expenditure, taxation requires £644,670 (£969,046), leaving consolidated net profit at £1,075,560 (£1,063,663).

Universal-Matthey

Associated company of Johnson Matthey and Co., and Universal Oil Products Co., Universal-Matthey Products, have formed a subsidiary company in Cologne—Universal-Matthey Products (Deutschland) G.m.b.H., with a nominal capital of D.M.20,000. Object of the new enterprise is the manufacture of platinum catalysts to meet the needs of petroleum refineries employing the U.O.P. platforming process in Western Germany and the Common Market countries. (See also p. 186 this issue.)

Vitamins Ltd.

Dividend of Vitamins Ltd. is raised from 20% to 25% for the year ended 31 March 1959. Group profit of £333,002, compares with £329,464, subject to tax of £155,873 (£183,303).

Allied Chemical

Second quarter sales of Allied Chemical Co., U.S., were the highest for any quarter in the company's history. Net income rose to $16,562,477, equal to $1.67 a share, against $8,582,870, or 87 cents a share, in the corresponding period of 1958.

Chemische Werke Albert

A dividend of 9% (1957: 8% plus 2% centenary bonus) is declared by Chemische Werke Albert A.G., Wiesbaden. In the past three years the company has invested a total of about DM.3,000,000 (about £250,000) and big investments are announced for the near future.

Courtaulds (Australia)

Earnings of £A534,074 are reported by Courtaulds (Australia) for the year to 30 June—the best result since formation of the company ten years ago, and an increase of £A147,198, or 38% over the previous year. Taxation took £A356,000, an increase of £A116,000 and depreciation £A469,494, or £A51,015 more.

Dynamit

Dynamit A.G., formerly Alfred Nobel and Co., Cologne, declared a dividend for 1958 of 14% (12%). During the year the company became 100% owner of the Chemische Werke Witten G.m.b.H. Dynamit-A.G.'s Rheinfelden plant has satisfactorily completed its first full year of operation. In the field of plastics concentration was shifted from 'traditional' products to the newer polymers and co-polymers.

Reichhold Chemicals

The highest sales and earnings in a six-month period are reported by Reichhold Chemicals Inc. for the first six months of 1959. Earnings were $1,754,000, including a profit of $558,000 from sales of investments, equal to 55 cents per common share on sales amounting to $47,412,000. Earnings were 32% up on the corresponding period of last year and sales 37% higher. New production units involved in a $24 m. expansion scheme are gradually coming on stream.

International Nickel

Net earnings of the International Nickel Co. of Canada Ltd. for the six months ended 30 June 1959 were $38,391,000, equivalent to $2.63 a common share. Figures for the corresponding period of 1958 were $21,401,000, or $1.46 a share. Fears of the steel strike in the U.S. contributed to the heavy demand for nickel.

U.S. Borax and Chemical

Recent cancellation of a major high-energy fuel programme will have no appreciable effect on sales and earnings of U.S. Borax and Chemical, the president, Mr. J. M. Gerstley, stated in Los Angeles. He said the company had been supplying relatively small quantities of boric acid in connection with the programme.

NEW COMPANIES

CHEMALKI LTD. Cap. £300. Manufacturers, importers, exporters, and distributors of and dealers in crude chemical products, chemicals, etc. Directors: Stewart Champion and Alec S. Bates. Reg. office: Trinity Works, Trinity Street, Stalybridge, Cheshire.

CONTROL DEVELOPMENTS LTD. Capital £1,000. Manufacturers of industrial and scientific instruments and controls and plant for the chemical industry, etc. Directors: W. Taylor, Ada Taylor, R. Gibson. Reg. office: 30 Gloucester Street, Gorton, Manchester.

J. A. GORDON (STROUD) LTD. Capital £10,000. Mechanical, constructional, chemical, refrigeration, mining, ceramic, plastic and general engineers, etc. The first directors are not named. Solicitors: Kent, Jones and Dorie, Alsager, Stoke-on-Trent.

IRISH FERTILISERS AND CHEMICAL CO. LTD. Capital £10,000. Directors: P. H. Brady, 13 Cowper Drive, Rathmines, Dublin, and K. Doolan.

MAST LABORATORIES LTD. Capital £1,000. Manufacturers of preparations for carrying out multi-coloured antibiotic sensitivity tests, etc. Directors: A. E. Brookfield, Doreen Parker. Reg. office: 128 Longmoor Lane, Liverpool.

YORKSHIRE ANTI-CORROSIVE CO. LTD. Cap. £1,000. Manufacturers of and dealers in all kinds of chemical products. Directors: Sidney Kiddle and Joan A. Kiddle. Reg. office: 16 Princes Street, Harrogate.

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TRADE NOTES

Rocol in France

An agreement has been signed between the Soc. Nouvelle des Huiles Minerales of France and Rocol Ltd., Swillington, Yorks, for the production of Rocol molybdenised and other specialised industrial lubricants in France and for their distribution in the Common Market.

Graviner Firewire Unit

Latest equipment to be developed by Graviner Manufacturing Co. Ltd., is a D.C. Firewire control unit, a chrome molybdenum steel extinguisher bottle containing bromotrifluoromethane pressurised to 400 p.s.i. at 20°C.

Burton Hardness Testers

British Indicators (Sales) Ltd., Sutton Road, St. Albans, Herts, have been appointed sole U.K. concessionaires for Burton hardness testers manufactured by J. O. Deakin and Co. Ltd. There are bench and portable models of this direct-reading metal hardness tester, which is comparable in operation to the Rockwell principle.

W.M. Flowline Valves

Advertisement of Warren-Morrison Ltd., 41 St. James's Place, London S.W.1, in CHEMICAL AGE, 18 July, p. 54, described this company's range of pinch valves. Owing to an error the illustration was not of a pinch valve, but of a diaphragm valve.

Compoflex-Pirelli Agreement

Compoflex Co. Ltd. have opened a London warehouse at Angel House, Pentonville Road, N.1 (Terminus 0533/4). Stocks to be held will include a range of Pirelli long length moulded rubber hoses following an arrangement with Pirelli of Milan, under which Compoflex will in future undertake the marketing in the U.K. and Ireland of certain long length hoses made by the Italian company.

Micro-hardness Tester

Nash and Thompson Ltd., Chessington, Surrey, have concluded arrangements for the marketing of the G.K.N. micro-hardness tester, manufactured by Associated Automation Ltd., Dudden Hill Lane, London N.W.10. Priced in the range of £290/340 (with microscope), this precision measuring instrument, which was developed by Associated Automation Ltd. and the Guest, Keen and Nettlefold Research Laboratories, enables indentations to be spaced less than 0.001 in. apart. Small sections, foils as thin as 0.0005 in. and individual crystals or phases can all be checked.

Rust Prevention

A novel method of preventing rust formation on the inside of water tanks of 100 to 1,500 gal. capacity has been evolved by Southern Metalife Ltd., Station Square, Harrogate, producers of Metalife liquid metals. In this case the Metalife has been cast solid, so as to form an anode in a cathodic protection system. The solid anodic metal unit is easily installed in a few minutes and the tank need not be emptied or put out of action. Once installed the unit will give 8-12 years' service depending on the exact size of the tank and the type of water and needs no further attention. All the metal below the water line will be protected even if the water is so hot that coatings and galvanised iron break down. Any rust already formed in the tank will be removed.

Nickel-Chromium Casting Alloy

Henry Wiggin and Co. Ltd., Thames House, Millbank, London S.W.1, have added Nimocast 713C nickel-chromium casting alloy to the range of Nimocast alloys. Nimocast 713C is the Wiggin-made equivalent of Inconel 713C, an investment casting alloy for high-temperature service developed in the research laboratories of the International Nickel Company, Inc., and already specified for the turbine rotor blading of a number of U.S. gas-turbine aero engines. Nimocast 713C is said to combine outstanding strength with excellent resistance to thermal fatigue at temperatures up to 980°C and is therefore of interest as a possible alternative to wrought alloys, which offer difficult production problems when developed for service at such high temperatures.

Pre-treated Fuel Oils

Improved operation of oil-fired boilers and furnaces without extra cost is promised by the use of Combustion Chemicals Premium fuel oils, which are regular grade residual fuel oils that have been pre-treated with Desulfurol fuel improver and sulphur inhibitor.

The oils are said to be sludge-free and to give better atomisation owing to the reduced surface tension—the spreading property is 2½ to 3 times that of the equivalent untreated fuel oil. Combustion efficiency is increased and lower preheat temperatures can be used.

'Eyes at Work'

Safety Equipment Division of J. and R. Fleming Ltd., 146 Clerkenwell Road, London E.C.1, has published a booklet entitled 'Eyes at Work,' obtainable on request. In addition to technical information concerning Armorglas toughened corrective/protective lenses, the booklet contains information on their prescription and dispensing with details of approved fees.

Barrel-Finishing Compound

A new siliconised barrel-finishing compound No. 10.LS is supplied by Lacrinoid Products Ltd., Gidea Park, Essex, as a liquid, ready to use. Advantages claimed are better finish, economy, ease in use, less pick-up on components, less build-up on wooden pegs and cubes, more runs without cleaning of pegs and easier cleaning of wooden carrying media.

Small Glassware

Leaflets listing their range of small glassware are published by the English Glass Co. Ltd., Empire Road, Leicester. The company specialise in making precision glass mouldings to users' requirements, their range covering mouldings from about ¼ in to 2½ in diameter.

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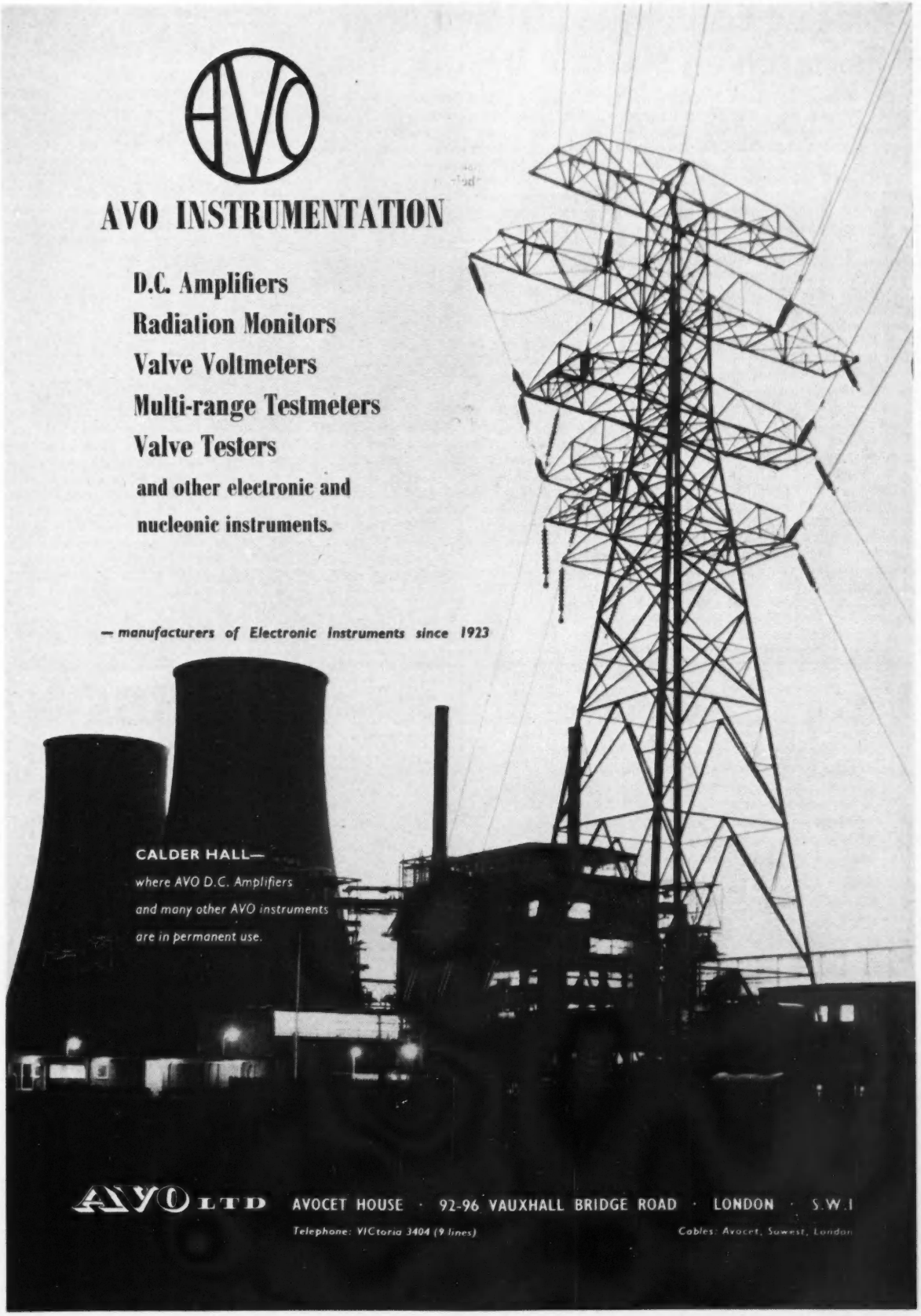

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Process Economies Claimed After Research on Marinol Drying Oils

FACTS of interest to users of drying oils have emerged from the research programme on Marinol K announced in January 1959 by Charles H. Windschuegl Ltd., 1 Leadenhall Street, London E.C.3, agents for Marine Oil Refiners of Africa Ltd.

Marinol K is a specially processed drying oil derived from fish oil, but altered in composition through the Solexol segregation process.

It is claimed that Marinol K can replace refined linseed oil in a full range of oil-modified alkyd resins, effecting an economy of some 15 to 20% on the cost of the basic oil, as no processing of Marinol K is required. A considerable reduction in processing time is achieved in all Marinol-K-based alkyds, and longer shelf life also results from the inclusion of Marinol-K-based alkyds. Trials have also shown improved surface hardness and better drying properties.

Excellent compatibility between Marinol K Alkyds and amino resins has been established, resulting in coatings with high gloss and absence of imperfections. Marinol K alkyd/amino blends are interesting bases for industrial stoving primers and finishes, and recent tests suggest that Marinol K alkyds also have distinctive anti-corrosive properties.

A lightly bodied Marinol K as a 15-poise stand oil has been found substantially better than boiled linseed oil for oil based anti-corrosive primers using red lead, calcium plumbate or iron oxide.

Technical bulletins incorporating these results are available from Charles H. Windschuegl Ltd.

Glass Fibre by New Process

GLASS fibre is being made by Fibreglass Ltd., St. Helens, by a new process based partly on French and American research.

It is claimed that the product is lighter for a given performance, can be compressed and will rapidly regain its normal thickness and does not contain the small globules of solid glass found in the earlier types of glass fibre. It is more pleasant and easier to handle. The cost should be the same for a given standard of insulation.

The plant will produce about 15 m. cu. ft. a year.

Will

Mr. Percy Tomlinson Akeroyd, director of Wilkinson and Akeroyd, Ltd., oleine, stearines, industrial soap manufacturers, Mirfield, Yorks, left £12,237 net.

Market Reports

Active Trading

LONDON Fairly active conditions have been reported from most sections of the chemicals market with contract deliveries covering good volumes.

Home and export demand for the soda products has been reasonably steady and the potash chemicals are in good request with prices well held at recent levels. Borax and boric acid supplies are moving steadily, the higher prices for these products operating from 17 August. Copper sulphate is in good request at £76 per ton f.o.b. Liverpool. Zinc oxide prices have fluctuated with the metal, the current price of the red seal being £99 per ton.

Among the coal-tar products pitch is finding a steady outlet on home account, and creosote oil and cresylic acid are moving steadily.

MANCHESTER Home-made inquiries on the Manchester chemical market during the past week have been on a moderate scale, but the movement of supplies under current contracts continues under holiday influences. The alkalis are in fair call and a quietly steady demand has been experienced for the potash and ammonia compounds and a wide range of miscellaneous chemicals. Fertilisers are still largely in the between-seasons period, a quiet business consisting mainly of early delivery rebate orders. A fair demand for refined tar and other by-products is reported.

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Keebush is an acid-resisting constructional material used for the construction of tanks, pumps, pipes, valves, fans, etc. It is completely inert to most commercial acids; is unaffected by temperatures up to 130°C; possesses a relatively high mechanical strength, and is unaffected by thermal shock. It is being used in most industries where acids are also being used. Write for particulars to—

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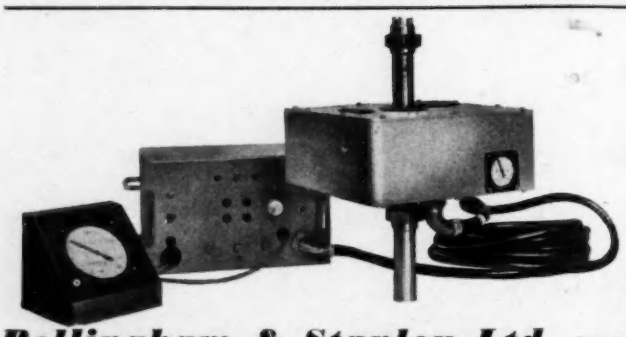

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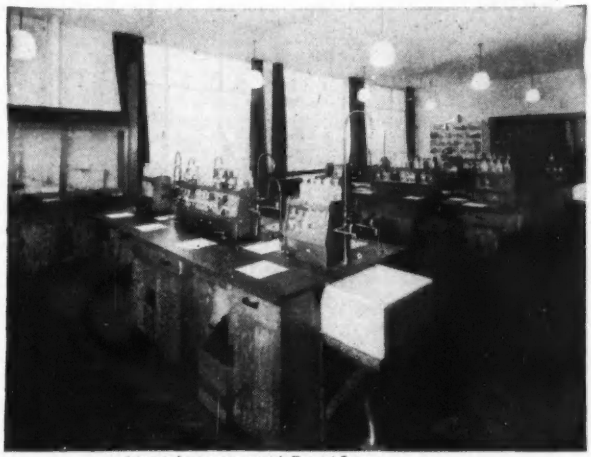

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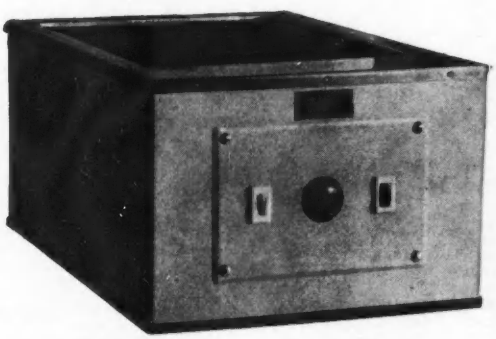

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NEW PATENTS

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Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

ACCEPTANCES

Open to public inspection 29 July

Production of granular perborates. Henkel & Cie, A.G. **817 377**
Manufacture of hydrogen peroxide. Laporte Chemicals. **817 566**
Vulcanisation process. Farbenfabriken Bayer A.G. **817 411**
Removal of hydrocarbons from sulphur dioxide gases. American Smelting & Refining. **817 560**
Organosilicon compounds. Midland Silicones Ltd. **817 237**
Catalyst composition, preparation and use. Kellogg Co., M. W. **817 308**
Process for antibiotic kanamycin. Umezawa, H., Udea, M., and Maeda, K. **817 385**
Preparation of ferrites of high initial permeability. Centre Nationale de la Recherche Scientifique. **817 458**
Herbicidal mixtures. Heyden Newport Chemical Corp. (Divided out of 817 173.) **817 174**

Open to public inspection 6 August

Polymerisation of olefins. Hibernia A.G. **817 632**
Process for concentrating nitric acid. Eastman Kodak. **817 730**
Antibiotic P.A. 371. Pfizer & Co. Inc., C. **817 729**
Resin compositions substantially stabilised against crystallisation. American Cyanamid. **817 741**
Polymerisation & copolymerisation of butadiene. Firestone Tire & Rubber Co. **817 693**
Preparing synthetic rubbery polymer. Firestone Tire & Rubber Co. **817 695**
Filamentary materials formed of polyolefins. Soc. Rhodiacetа. **817 626**
Cooling of titanium dioxide suspensions in gases. Fabrienes des Produits Chimiques de Thahn et de Mulhouse. **817 940**
Production of polyene carboxylic acids having isoprene structure, or esters of same. **817 884**
Polymerisation of olefins. Sun Oil Co. **817 887**

Open to public inspection 12 August

Batchwise catalytic process for alkylene polymers and catalysts. Bataafsche Petroleum. **818 033**
Olefinically unsaturated compounds and polymeric compounds derived therefrom. Koppers Co. **818 143**
Production of phthalic acids and formic acid. Mid-Century Corp. **818 302**
Manufacture of pure terephthalic acid. Farbwerke Hoechst, A.G. **818 211**
Process for obtaining SO_2 from waste gases. Leuna-Werke W. Ulbricht Veb. **818 155**
Linear polyesters and polyester-amides. Kodak Ltd. **818 157**
Manufacture of titanium. I.C.I. Ltd. **818 002**
Production of polymerisation catalysts and of polyethylenes. Petrochemicals Ltd. **818 308**
Melt spinning of polypropylene. I.C.I. Ltd. **818 100**
Elastomers having improved elastic characteristics obtained from linear amorphous polymer alpha-olefins higher than propylene. Montecatini. **818 287**
Electrolytic production of perchloric acid. Merck A.G. **818 335**
2-Butyne-1:4-diol. British Oxygen Co. [Addition to 784 638]. **818 314**
Concentrated caustic alkali solutions. B.A.S.F. **818 256**
Recovering gallium from its ores. Dow Chemical Co. **818 159**
Ammonia-soda process for manufacture of soda ash. Diamond Alkali. **817 620**

Open to public inspection 19 August

Polymerisation products. Peterlite Products. **818 471 & 818 472**
Polymerisation process. Tee-Pak, Inc. **818 412**
Polymer recovery process. Phillips Petroleum Co. **818 461**
Densimetric separation of solid materials. Preparation Industrielle des Combustibles. **818 386**
Manufacture of anhydrous aluminium chloride. Gulf Research & Development Co. **818 462**
Palladium reforming catalysts. [Addition to 735 390.] Englehard Industries Inc. **818 387**
Epoxidized hydrocarbon polymers as resin plasticizers. Esso Research & Engineering Co. **818 388**
Process of olefinic fraction to form dienes. Esso Research & Engineering Co. **818 390**
Polymerisation products and production thereof. Farbenfabriken Bayer A.G. **818 715**
Manufacture of fatty esters. Marchon Products Ltd. **818 393**
Desulphurisation of fluid coke particles. Esso Research & Engineering Co. **818 527**
Manufacturing water or hydrogen sulphide rich in deuterium. Rensselaer Polytechnic Inst. **818 421**
Apparatus for the partial oxidation of hydrocarbons. Union Carbide Corp. **818 395**
Reactive fluorocarbon compounds. Minnesota Mining & Manufacturing Co. **818 756**
Manufacture of acrylonitrile. American Cyanamid Co. **818 722**
Hydantoin derivatives. Imperial Chemical Industries Ltd. **818 724**
Production of boron hydrides. Imperial Chemical Industries Ltd. **818 426**
Polymerisation of olefin oxides. Union Carbide Corp. **818 747**
Manufacture of synthetic linear polyamides. Inventa A.G. **818 410**
Perborate composition and a method for its production. [Divided out of 818 373.] Theobald Industries. **818 374**
Recovery of benzene. Esso Research & Engineering Co. **818 749**

Open to public inspection 30 September

Manufacture of complex protein compounds. Thies, K., Strell, M., and Kalojanoff, A. **821 036**
Substituted phenyl urea herbicidal compositions. Du Pont De Nemours & Co., E. I. **821 104**
Esters of 2:3-dimercaptopropanol. Beecham Research Laboratories. **820 954**
Herbicidal compositions. [Cognate applications 26689, 26690 and 26831.] Fisons Pest Control Ltd. **821 039**
Catalyst systems for polymerisation of unsaturated compounds. Imperial Chemical Industries Ltd. **821 142**
Polymerisation of olefins. Imperial Chemical Industries Ltd. **821 107**
Process for production of non-dusting and non-caking fertilisers containing potassium salts. [Addition to 769 243.] Burbach-Kaliwerke A.G. **820 956**
Stabilisation of phenols. Imperial Chemical Industries Ltd. **820 960**
Stabilised polypropylene. Imperial Chemical Industries Ltd. **820 967**
Hydrocatalytic desulphurisation processes. British Petroleum Co. Ltd., and Porter, H. T. **820 873**
Polymerisation of organic isocyanates. Imperial Chemical Industries Ltd. **821 158**
Method for separating CO_2 and H_2S from gas mixtures. [Addition to 725 000.] Benson, H. E., and Field, J. H. **821 166**
Catalytic dehydrogenation of olefins. Polymer Corp. Ltd. **820 905**
Polyester plasticisers for aminoplast resins. California Research Corp. **821 176**
Method of producing propylene polymers. Bergwerksgesellschaft Hibernia A.G. **821 118**
Preparing a silica-magnesia hydrocarbon cracking catalyst. Grace & Co., W. R. **820 986**
Treatment of vapour-entrained dispersions of particulate solid materials. Texaco Development Corp. **820 989**
Block and graft copolymerisation. Canadian Industries Ltd. **821 000**
Production of polymers. Badische Anilin- & Soda-Fabrik A.G. **821 186**
Gas/liquid contacting means. [Addition to 802 374.] Distillers Co. Ltd. **821 127**

Open to public inspection 26 August

Hardenable derivatives of formaldehyde condensation products of the aminotriazine or urea group. Ciba Ltd. **818 844**
Polymerisation of ethylene. [Addition to 811 633.] Farbenfabriken Bayer A.G. **818 985**
Manufacture of nitrogen-containing copolymers. Wacker-Chemie G.m.b.H. **818 843**
Irradiation of polymeric compounds. Esso Research & Engineering Co. **818 919 & 819 147**
Polyethylene of improved stability. [Addition to 773 529.] General Electric Co. **818 963**
Production of ureas. Monsanto Chemical Co. **818 864**
Cleaving cumene hydroperoxide into phenol etc. California Research Corp. **819 026**
Recovery process for gibberellins. Pfizer & Co. Inc., C. **819 110**
Concentrating urea solutions. Stamicarbon N.V. **819 030**
Preparation of piperazines. Abbey, A. (Dow Chemical Co.). **819 126**

AMENDED SPECIFICATIONS

On Sale 22 September

Copolymers of trifluorochloroethylene and vinylidene fluoride and method for their preparation. Kellogg Co., M. W. **742 908**
Ethoxyline resin compositions and their preparation. General Electric Co. **788 437**

Contracts for Proton Synchrotron

Contracts amounting to more than £430,000 have been placed by the National Institute for Research in Nuclear Science for the manufacture of the magnet coils required to energise the 7,000-ton electromagnet of the 7,000 million electron-volt proton synchrotron. This machine, named Nimrod, is being built at the Rutherford High Energy Laboratory, Harwell. A substantial contract has also been awarded to Marston Excelsior Ltd., Wolverhampton, for the development and supply of the reinforced plastics vacuum chamber in which the protons are accelerated.

Synthetic Rubber Symposium

The 2nd international synthetic rubber symposium will be held at Church House, London S.W.1 on 11 to 13 October 1960. Lectures will be given by synthetic rubber experts from North America, Great Britain and Western Europe. Further details can be obtained from *Rubber and Plastics Age*, Gaywood House, Great Peter Street, London S.W.1.

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MINISTRY OF SUPPLY: INDUSTRIAL CHEMISTS. 10 pensionable posts for men and women at least 23 and under 35 on 1.1.59; extension for regular Forces service, H.M. Overseas Civil Service, established civil service, and temporary service as Industrial Chemist. Candidates must normally have honours degree in metallurgy, engineering, chemistry, physics, or chemical engineering, *or* have achieved Associateship or Graduate Membership of Royal Institute of Chemistry, Associateship of Institution of Metallurgists or Institute of Physics, or Corporate Membership of Institution of Chemical Engineers. Starting salary (men, London) from £690 to £1,125 according to age. Scale maximum £1,300. Promotion prospects. Write Civil Service Commission, 17 North Audley Street, London, W.1. for application forms quoting S 5007/59. Closing date 11th September 1959.

SOMERSET COUNTY COUNCIL

CHEMIST required in the County Surveyor's Department, A.P.T. Grade IV (£1,065—£1,220). The person appointed will be in charge of the department's laboratory at Wells and the duties will mainly be concerned with the testing of roadmaking materials. Experience of the roadmaking industry is not essential. Applicants must be suitably qualified by examination.

Car Allowance. Superannuation.

Full particulars and forms obtainable from the undersigned. Closing date 10th September, 1959.

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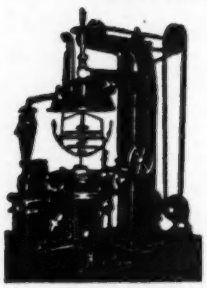

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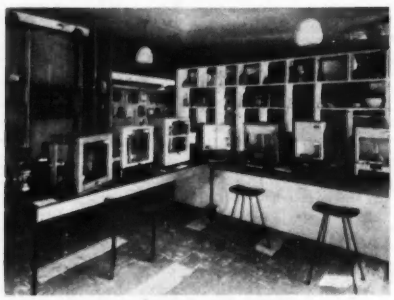

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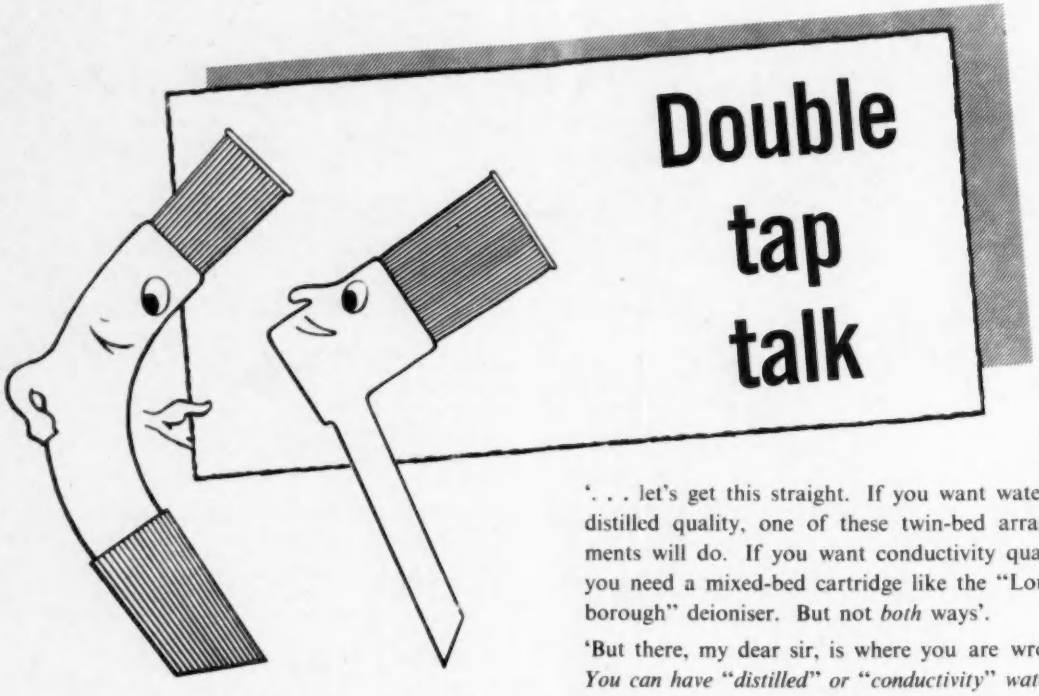
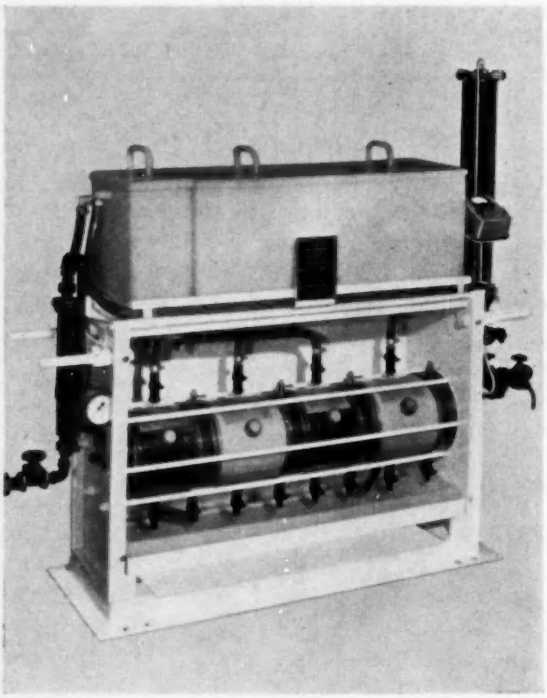


Double tap talk

'. . . let's get this straight. If you want water of distilled quality, one of these twin-bed arrangements will do. If you want conductivity quality, you need a mixed-bed cartridge like the "Loughborough" deioniser. But not *both* ways'.

'But there, my dear sir, is where you are wrong. *You can have "distilled" or "conductivity" water—up to 30 gallons an hour of it—from Loughborough's new Stonwata A.300 deioniser*'.



'Now, just a minute! "distilled" or "conductivity" water out of the same tap? That's stretching it a bit far, isn't it?'

'Not a bit. The A.300 is really two units in one. The multi-bed unit produces "distilled" water. You can either use it as it is, or pass it through the mixed-bed cartridge to step it up to "conductivity" level—all at the turn of a tap'.

'Mm! Sounds feasible—but I shudder to think of the regeneration problems'.

'Not with this one. The clever way the multi-bed unit's been designed makes that very simple—you just fill up the built-in tanks with regenerants, open the valves, and in an hour it is *ready to yield another* 300 *to* 2,000 *gallons*, according to your water supply'.

'And the cartridge. . . .?'

'Oh! That goes back to Loughborough, but since it has "distilled" water fed to it, you only need to do this every 1,000 gallons or so'.

'300-2,000*gallons, eh*? I'm going to find out more about this'.

'Well, you only have to drop a line to . . .

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